

# THE IRON AGE

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## Preventing Accidents by Education

Results Secured by the Cleveland Hardware Company—Rivalry Between Departments—Suggestion of Remedies by Employees

While safety devices in shops materially cut down the number of accidents, a great deal in the way of accident prevention can be accomplished by educating workmen to be cautious so that certain accidents, common in most factories but which for the most part cannot be guarded against by safety devices, will be largely eliminated. Shop accidents may be divided into two general classes, those that can be prevented by safety devices and those caused by carelessness or lack of caution on the part of workmen and which can, to a large extent, be prevented if the workmen are careful. Accidents cannot be reduced to a minimum if all the machinery is properly safeguarded unless attention is paid to the human element and the men are taught to be careful. The education of workmen to be cautious is at present the great problem of accident preven-

tion in the opinion of the management of the Cleveland Hardware Company, Cleveland, Ohio, and it is devoting much attention to this phase of the "Safety First" subject, at the same time, however, not neglecting the installation of any device that may lessen the possibility of accidents.

To aid in carrying out this educational work and at the same time to have on hand complete data relating to accidents and their causes so that the danger of similar accidents may be speedily removed if possible, a complete record of all accidents is kept on a blank, which is filled out each week, similar blanks being used for recording the accidents in each of the company's two plants. All accidents are tabulated under three main headings, as shown in the accompanying illustration, one of these being for the location of injury, another for the

Form 422

Plant No. 1

### Accidents

Week of .....

Department	Location										Cause										Nature										TOTAL		
Serious .....	Total	Head	Neck	Arm	Hand	Eye	Foot	Back	Body injury																								
Minor .....		Face	Blind	Wrist	Arm	Hand	Eye	Toe	Foot	Ankle	Body injury																						
Machine Shop																																	
Forge																																	
Mill & Yard																																	
Warehouse																																	
Drills 2nd fl. Girls																																	
Presses 3rd fl. "																																	
4th fl. "																																	
Bending Room 3rd fl.																																	
Drills 2nd fl. Men																																	
Presses & Welders 4th fl. Men																																	
Bow Socket 1st fl.																																	
Grinding & Polishing Basement fl.																																	
Handling Dept. (Moving)																																	
Power & Light																																	
Improvement																																	
Forge Night Turn																																	
Miscellaneous																																	
TOTAL																																	

The Summary Sheet Which Gives the Record of All the Accidents in a Week Classified According to Location, Cause and Nature of Injury and the Portion of the Plant Where It Occurred

cause and the third for the nature of the injury. Under the caption of location separate spaces are provided to show what member or portion of the body was injured. Under the heading of causes there are subheads for listing the cause of injuries, such as hammer, press, emery wheel, etc. The necessary subheads are provided under the general heading of nature of the accidents to show whether the injury was a burn, fracture, laceration or one of the other listed injuries. Under each general heading blank spaces are provided for listing such injuries that in location, cause and nature do not come under any of the general classifications. The blanks are so arranged that a separate record of the accidents of each of the various departments is kept on the same printed form so that at a glance the number of accidents in one department can be compared with those in another department.

Each weekly report includes not only the record of injuries of that week, but those of preceding weeks since the system was inaugurated, so that each report on a sheet 8 x 11 in. in size, is a complete record of accidents for a given time. These reports are bound together, the last one being placed on the top of the file each week. The number of accidents in each department is footed up in a column at the right of the blank and a similar summing up of the injuries according to location, cause and nature of the accident is made at the bottom. The number of accidents in any one department or from any one cause during a week is quickly learned by subtraction. For example, if the last weekly report shows 50 accidents in the machine shop and the previous report shows 40 there were 10 accidents in that department during the week covered by the last report. Space is provided near the upper left corner for listing the total number of serious accidents and the minor accidents. In serious accidents are included those that require the attention of a nurse and physician.

#### EMPLOYEES' SUGGESTION BLANKS

A report of every injury is made immediately by the foreman of the department in which it occurs. This report gives the man's name, nature of injury and cause, and a space is provided for a suggestion from the foreman as how to prevent similar accidents. These foremen's reports are used in compiling the weekly reports, and the individual reports can be referred to should more complete data be desired regarding the cause of the injury. A similar report of each injury is made by the dispensary and these reports are used as a check against each other so that the foreman or dispensary can be taken to task if either fails to make a report on an accident.

Copies of each weekly report are sent to every foreman who keeps them in paper covers bearing in large letters the words "Safety First, My Record," and a large red circle, the safety emblem. These reports show the foreman the number of accidents in his department as compared with other departments and impress upon him the large proportion of accidents due to lack of caution on the

part of the men. In this way the foreman is encouraged to make a good showing by reducing the number of accidents in his department and by having fewer than the other departments. The accident record shows a large number of accidents from such causes as the careless use of a hammer, the careless pushing of a loaded truck, the use of an old tool and from the pouring of hot metal into a mold, the workman taking the chance of a possible explosion and not protecting his eyes with goggles. The company is conducting a campaign of education among its men to eliminate accidents from these and various other causes. Considerable attention is being paid to the wearing of proper clothing, the rolling up of sleeves if the men are working where their shirt sleeves may become caught in moving machinery and to requiring that the men wear shoes that are not defective.

Weekly reports show where accidents are most frequent and the management quickly gives attention to finding out and taking steps to eliminate the cause. If there should be a sudden increase of accidents in a certain department the accident record shows this and the matter is at once investigated to find out and eliminate the underlying cause. For example, the reports recently showed three accidents in a very short time from broken sledge handles. In this case no further inquiry was necessary to find the cause. Instead the suggestion went to the Purchasing Department to ascertain whether handles of the usual standard were being purchased, whether the seller was furnishing a grade of handles not up to specifications or whether to economize the purchasing agent was buying a cheaper and inferior handle that caused the increased breakage and greater number of accidents.

The interesting fact has been brought out in the company's accident reports that the fewest accidents occur in the departments that are regarded as the most dangerous. With practically the same number of employees in each department during the period since the present system of recording accidents was adopted there have been 38 accidents in the machine shop, 7 in the rolling mill and yard and 9 in the girls' press room. The forge shop, with about twice as many employees as each of the other departments noted, had 27 accidents during the same period. That the machine shop which employs the highest class of labor in the plant had more than five times as many accidents as the rolling mills is attributed to the fact that men in the rolling mill regard danger as imminent and are on their guard. They are in close proximity to hot metal and realize that a slight touch will cause a serious burn. Press work is regarded as quite dangerous and largely as a result of caution there have been few accidents to girls operating presses. The same caution, however, is not observed in the machine shop, and to this lack of caution the comparatively large number of accidents in that department is attributed. Men in the machine shop do not realize that carelessness is likely to result in injury as do their associates who are working around the hot metal in the rolling mill.

Employee's Report of Accident.	
WORKMAN INJURED.	
Name	No.
Nature of injury	
Cause	
To prevent similar accident I suggest	
Signed	
Name	No.

Accident Report Slip That Is Filled Out After Each Accident. Note the Space for Suggestions to Prevent a Recurrence

# Effect of Oxygen on Cast Iron\*

Its Presence in Pig Iron Claimed to Impart a Quality Which Persists on Remelting and to Produce Superior Castings

BY J. E. JOHNSON, JR.†

The doctrine of chemical control of the quality of pig iron has met obstacles, small but exceedingly difficult of removal. The old school of metallurgists, who knew but little chemistry, had always insisted that there were fundamental differences in quality which were not revealed by analysis. The more ardent advocates of the newer theory of chemical control ridiculed this view. Those whose position forced them to look for the facts, from whatever source derived, came gradually to believe that while the theory of chemical control was in a broad way correct, there were certain facts which this theory did not cover, and that the old-school metallurgists, while wrong in many of their notions, were undoubtedly right as to this.

In our search for the explanation for these discrepancies there seemed, after the most careful consideration, to be two facts which might be taken as established:

1. That certain irons possessed a quality as they came from the furnace which was preserved on remelting, and which reappeared in castings of which these irons formed an important ingredient.

2. That the rarer elements, such as nickel, cobalt, chromium, titanium, vanadium, and the like, while not absent from the point of view of ultimate analysis, were in such small quantity and varied in ways so entirely independent of the quality of the iron that the explanation could not be attributed to them.

In spite of the certainty in our own minds regarding conclusion No. 1, and the amount of qualitative confirmatory evidence we had on the subject from innumerable users, we felt that there might be some hesitation on the part of others in accepting it, and we accordingly decided to make a series of

tests which should, if possible, be so conclusive as to admit of no dispute.

We took six irons constituting three pairs, the irons of each pair containing the same silicon (approximately) but having a very different fracture and different strength, as shown by test bars cast from the furnace. The silicon of the three pairs was about 1.90, 1.00 and 0.70 per cent. (See table for complete analysis.) We remelted these in twin crucibles, as will be described later, and cast test bars from the remelts.

In addition to the silicon we determined the graphitic and combined as well as the total carbon in each iron, both before and after remelting. We also made photomicrographs of the original pig and of a test bar from the remelt, both etched and unetched, for each of the six irons. We have arranged these in groups of eight, each representing one of the pairs. These show at the left the photomicrographs of the original iron; at the right, those of the remelts. Above in each case are the good irons, below are the poor ones. Underneath the photographs are given the silicon, and the breaking strength of the 1.25-in. bars. All of the specimens were taken from corresponding places in the pig or test bar, and are fairly representative of the structure as a whole. (Only 16 of the 24 photomicrographs are reproduced here, the other 8 representing the 0.70 per cent. silicon iron with an oxygen content of 0.065 per cent. They show the same crystalline characteristics as the others. Fig. 17 shows the structure of the electric furnace pig iron in which oxygen is absent.)

In order to show quantitatively the relation between strength, combined carbon and graphite we made combined carbon determinations, by difference in all cases, on the 1-in. bars, but the greater chilling of 1-in. bars in the medium No. 3 iron threw the

\*From a paper read before the New York meeting of the American Institute of Mining Engineers, February 17 to 19, 1914.

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Table Showing Complete Analyses of the Six Pairs of Irons

Original Iron.		Remelt No.	Breaking Strength.		T. C.	G. C.	C. C.	Si.	Mang.	Phos.	Sn.	N.	O.	Micrograph No.	Fracture.
Cast No.	Kind.		1.25-In. Rd. Bars.	2-In. Square Bars.											
A	Soft 1		3,000 3,350		4.00	3.22	0.78	1.90	0.62	0.139	0.017	0.006	0.027	1 & 2	Close grain for grade.
A	Soft 1	R. 291	3,150 3,200	16,000 15,900	4.05 4.05	3.40 3.05	0.65 1.00	Sample taken from 2 in. bar Sample taken from 1 in. bar						5 & 6	
B	Spl. 1		2,500 2,900		4.09	3.43	0.66	1.88	0.70	0.112	0.020	0.0030	0.009	3 & 4	Very open, low chill.
B	Spl. 1	R. 292	2,600 2,700	13,000 13,900	4.08 4.03	3.30 3.29	0.78 0.79	Sample taken from 2 in. bar Sample taken from 1 in. bar						7 & 8	
C	High 2		3,400 3,500		4.00	3.05	0.95	1.00	0.46				0.038	9 & 10	Close grain, $\frac{1}{4}$ -in. chill.
C	High 2	R. 297	3,800 3,700	16,000 15,000	3.96 3.96	3.00 2.96	0.96 1.00	Sample taken from 2 in. bar Sample taken from 1 in. bar						13 & 14	
D	High 2		2,400 2,900		4.05	3.15	0.90	1.00	0.50				0.009	11 & 12	Open grain, no chill.
D	High 2	R. 298	3,000 2,800	14,900 12,000	4.13 4.13	3.00 3.16	1.13 0.97	Sample taken from 2 in. bar Sample taken from 1 in. bar						15 & 16	
E	Med. 3		3,500 4,200		4.10	3.50	0.60	0.70	0.60	0.128	0.035		0.065		Very close grain, 0.25-in. chill.
E	Med. 3	R. 301	4,150	19,300 20,800	4.10	2.90	1.20	Sample taken from 2 in. bar							
F	Med. 3		2,500		4.49	3.60	0.89	0.72	0.59	0.108	0.024		0.009		Open grain, $\frac{1}{4}$ -in. chill.
F	Med. 3	R. 302	2,750	10,900 12,900	4.49	3.20	1.39	Sample taken from 2 in. bar							



combined carbon far beyond the eutectoid ratio, and we did not think this constituted a fair comparison. We therefore ran the combined carbon in all the 2-in. bars, taking the sample from the exact center of the broken face of the 2-in. bar, so as to make the results as nearly comparable as possible in each case. These results are shown in the table.

In pair 1, silicon 1.90 per cent., the combined carbon in the strong iron was 0.65 per cent., and in the weak iron 0.78 per cent. The graphite in the strong iron was 3.40 per cent., in the weak iron 3.30 per cent.

In pair 2, 1.00 per cent. silicon, the strong bar contained 0.96 per cent. combined carbon, the weak iron 1.13 per cent. The graphite was exactly the same in both, 3.00 per cent.

In pair 3, 0.70 per cent. silicon, the combined carbon in the strong iron was 1.20 per cent., in the weak iron 1.29 per cent. The graphite in the strong iron was 2.90 per cent.; that in the weak iron 3.20 per cent.

In every one of these cases it will be seen that if we take account only of the quantity of combined carbon as increasing the strength of the matrix and that of graphite as reducing the same, we shall get results exactly opposite to the actual ones, except as regards the graphite in pair 3, and even here the difference in favor of the strong iron is slight. It may be that the matrix is somewhat stronger in the strong iron, but inspection of the sets of photographs with an unprejudiced mind will force one to the conclusion that the principal reason for the difference is the shape and size of the graphite formed in the two cases, and that quantitatively this difference is ample to account for the difference in strength.

It seemed inconceivable that a quality which would survive remelting and superheating to a point well above the fusion point, as in foundry practice, should be a purely physical quality. In other words, if one iron were better than another because cast at a lower temperature, for instance, and for no other reason (both being identical in analysis), when both were remelted to the same temperature and recast under the same conditions, it is incredible that they would not lose the difference in quality due to this difference in original casting temperature. As the difference in quality evidently did persist in spite of remelting, it seemed to me necessary to believe that the difference was a chemical one.

#### GASEOUS ELEMENTS THE CAUSE

As a consequence of this conclusion and of the establishment to our satisfaction of the second fact above mentioned, that the less common elements were not responsible for these differences in quality

in general (though undoubtedly they exert marked influence in special cases), it seemed inevitable that some of the common elements, not ordinarily determined, must be accountable for these variations in quality. Of these, the most universally present in the blast furnace, oxygen, nitrogen and hydrogen, are the most common and seemed a likely field for investigation.

#### OXYGEN IN COKE IRONS

Some metallurgists have taken the view that it was impossible for oxygen to exist in the presence of so highly carbonized a product as cast iron, and at so high a temperature as that of the blast fur-

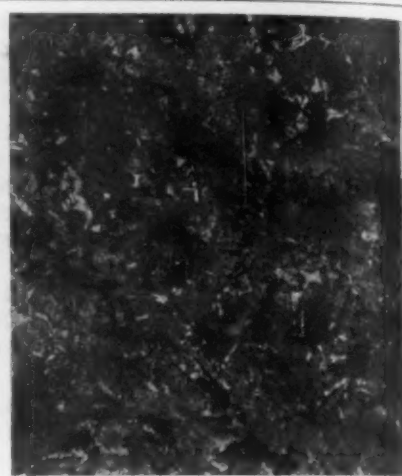


Fig. 1—Unetched  
Reduced About One-third from an Original Diameter of 100. Good Iron. Silicon 1.90 and Oxygen 0.027 Per Cent. Breaking Strength, 1.25-In. Bar, 3000 and 3350 Lb.



Fig. 3—Unetched  
Reduced About One-third from an Original Diameter of 100. Poor Iron. Silicon 1.88 and Oxygen 0.009 Per Cent. Breaking Strength 1.25-In. Bar, 2500 and 2900 Lb.

Fig. 4—Etched

nace, but about ten years ago I had made certain observations which seemed to me to indicate strongly the presence of oxygen in cast iron. The facts observed at that time have a sufficient bearing on the present matter to justify their presentation here.

The furnaces of the Longdale Iron Company, in whose employ I was at that time, ran continuously for many years on basic iron, with an absolutely constant ore mixture and with a blast temperature which was, to all intents and purposes, unvarying from one year's end to another, 850 deg. F. Careful and long continued observation of the appearance of the iron, and particularly of the small sample chill pig made at each cast, in conjunction with the analysis, taken with the working of the furnace



itself and the character of the running iron, brought out clearly certain conditions which prevail to a certain extent at all plants, but not so conspicuously at those with less constant conditions.

Marked differences in the fracture of the iron for a given analysis were observable according to whether the iron was "wild" on irregular furnace conditions, or whether the operation was normal and the iron "quiet." On white irons, in good normal working condition of the furnace, the fracture of the chill pig was practically square, with clearly marked acicular crystals running perpendicularly from the chilled surfaces of the pig, even from the top in some cases, and clearly showing lines running

sence of crystals, while the gray portion was exceedingly fine grained, and dark, almost purplish in color, so as to give it a velvety appearance.

In coke practice a wild-working furnace is almost always associated with higher sulphurs, and the irons last described, both white and gray, came to be cordially detested as showing, even in advance of analysis, high sulphur.

It is a matter of much interest to observe that the white irons showed in an increasing degree, as they became wilder, cleavage surfaces which were discolored with the blue, red, and purple "oxide colors." This was commonly attributed to oxidation by the absorption of air into cooling cracks in the pig, but I have seen many cases when these surfaces could only be broken apart by the most tremendous sledging, and this never seemed to me to correspond with the idea of a crack of sufficient width to permit the ingress of air.

These "wild" irons, particularly the harder ones, as they cooled, threw off a scale of considerable thickness, continuous at first and detaching itself from the surface of the pig in slabs frequently as large as one's hand. Thinking that this scale might be an indication of something, I had it analyzed for sulphur, with the surprising result of finding only about one-third as much sulphur in the scale as was in the iron.

After the chemist, who made this analysis had left, I was discussing this remarkable result with his successor, who had been the assistant at that time. He told me that the analysis had been made by the evolution method, and that if the sulphur were in the oxidized condition it would not be given off by this method, causing a low result, and that it would be necessary to use the gravimetric or fusion method to obtain correct results in this case.

On the first subsequent occurrence of this scale I accordingly had an analysis made by the latter method, with the result of finding, instead of one-third as much sulphur as in the pig, about

three times its former quantity.

About this time Prof. E. D. Campbell, of Ann Arbor, published a paper describing the remarkable ability of the oxysulphides of iron and nickel to penetrate the solid walls of iron tubes. It then seemed possible that this scale might be an oxysulphide, which exercised this peculiar penetrating power to make its escape through the crystals of the solidifying pig, and gathered on its surface.

If this were true, then the "wild" irons which showed this scale should contain some of their sulphur in the oxidized condition, and the results obtained by the ordinary volumetric analysis for sulphur would show a lower result in such irons than the gravimetric, whereas, in the irons on a normal

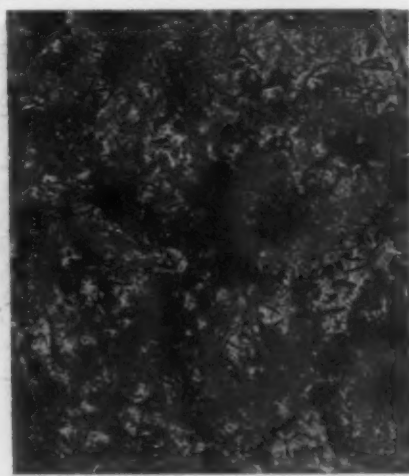
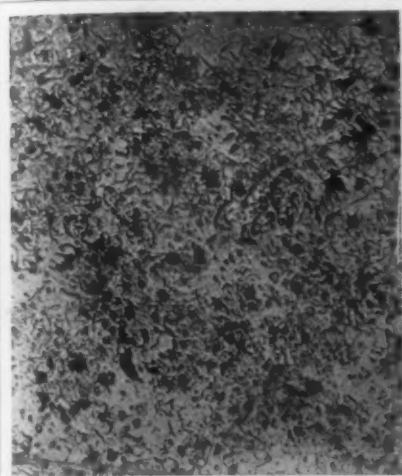


Fig. 5—Unetched

Fig. 6—Etched

Reduced About One-third from an Original Diameter of 100. Remelt. Silicon 1.90 Per Cent. Breaking Strength, 1.25-In. Bar, 3150 and 3200 Lb.



Fig. 7—Unetched

Fig. 8—Etched

Reduced About One-third from an Original Diameter of 100. Remelt. Silicon 1.83 Per Cent. Breaking Strength, 1.25-In. Bar, 2600 and 2700 Lb.

from the center to the corners, these lines being where the sets of crystals from adjacent sides met. On a "wild" iron of similar analysis the fracture was smooth, but conchoidal rather than square, with a complete absence of crystals radiating from the sides of the pig, and, of course, a corresponding absence of the interference lines of these adjacent sets of crystals running to the corners.

Irons with higher silicon when made on a smoothly running furnace had a comparatively slight chill. Such as there was showed strongly marked acicular crystals similar to those in the white iron, the grain quite open and the color light. When made on a wild-working furnace, iron with approximately the same silicon had greater chill with ab-

working furnace (in the absence of titanium) a small and constant difference is found. Accordingly it seemed that the difference between the volumetric and the gravimetric sulphur should increase from normal iron to "wild" iron.

Quite a number of comparative analyses were made to determine whether this were actually true, and the results confirmed this theory to a remarkable degree. Of something like 12 irons picked to show either a high or a low difference between volumetric and gravimetric sulphur, according to the way the furnace was working, about 10 showed the expected result. No record, unfortunately, has been preserved of this work, but I remember that in one case the gravimetric sulphur was 50 per cent. higher than the volumetric, the latter being 0.034 and the former 0.051 per cent., this being on a particularly "wild" iron.

#### OXYGEN IN CHARCOAL IRONS

When I first began making charcoal iron, the founder told me of "special cylinder" iron, which he described as an "iron with a No. 2 analysis and a No. 3 fracture, made when the furnace was coming up out of a scrape." I asked to be shown a specimen of this iron, and being struck by its absolute similarity of appearance to the "wild" gray iron made on a coke furnace under similar conditions, I was at once convinced that it contained oxygen and that the notion of its superiority to ordinary iron was an erroneous one; and I condemned it without qualification.

I was strongly of the opinion then that the more easily reducible the ore the better would be the iron, because the more thoroughly deoxidized it would be. This was very strongly the opinion of William Wilkin, general superintendent, and he accordingly bought some Mesaba ore of first-class physical structure, containing about 7 per cent. of combined water; in other words, a fine limonite; and we made a test with this ore, substituting it for our regular Gogebic hematite, a little at a time.

We had by that time instituted the making of test bars from every cast, and could observe directly the variations in the strength produced by different conditions. We found that the strength of the iron fell steadily as the percentage of Mesaba increased, so that it dropped from 2800 to 2900 lb. on a 1.25-in. test bar to about 2400 lb. when we had on from 75 to 80 per cent. of the fine limonite. We then took off the Mesaba, got the furnace back on to an all soft-hematite burden and repeated the experiment, with absolutely identical results.

About that time my attention was called by another furnace-man to coke irons made on an all-limonite burden, which were of beautiful analysis, soft, open grained, and exceedingly weak. It then

occurred to me that we had disliked the "wild" coke irons because they were generally associated with high sulphur, without regard to their physical characteristics, and, on thinking it over, I realized that they were not infrequently exceedingly strong, tough irons; and finally it seemed to me likely that by reversing my former opinion absolutely we might perhaps get a theory which would conform more closely to the facts, and that it might be the presence of a certain amount of oxygen (in what form I do not pretend to say) that produced certain characteristics as to fineness of grain, chilling qualities, strength, and toughness, which are so much desired. It is now more than two years ago that I

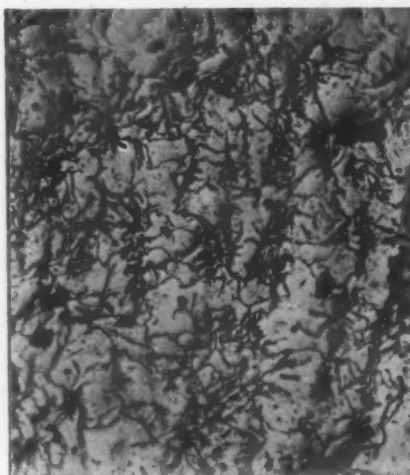


Fig. 9—Unetched

Reduced About One-third from an Original Diameter of 100. Good Iron. Silicon 1.05 and Oxygen 0.038 Per Cent. Breaking Strength, 1.25-In. Bar, 3400 and 3500 Lb.

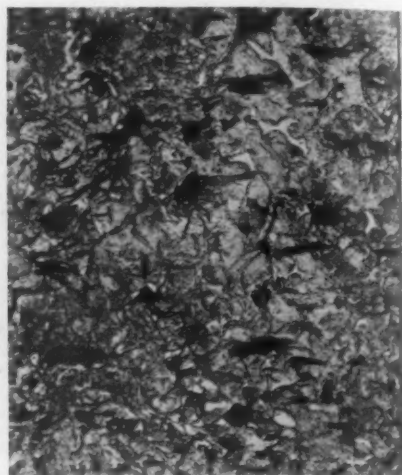


Fig. 10—Etched



Fig. 11—Unetched

Reduced About One-third from an Original Diameter of 100. Poor Iron. Silicon 1.00 and Oxygen 0.009 Per Cent. Breaking Strength, 1.25-In. Bar, 2400 and 2900 Lb.



Fig. 12—Etched

began to work on this hypothesis with all the means at my command.

I have previously mentioned a product virtually unknown at coke furnaces, which we call spongy No. 6. This is an iron made on an exceedingly cold furnace, perfectly white, and filled with a mass of blow-holes so great as to occupy up to a half or even more of the volume of the metal. The walls of these blow-holes are as white as silver. The cause evidently is the descent into the hearth of a mass of incompletely reduced iron, which, mixing with the liquid iron already present, sets up an action almost like that in an open-hearth furnace. The silicon is removed down to the barest trace, 0.03 per cent. or so, and the carbon is then attacked and oxidized



from the normal 3.50 to 4.00 per cent. down nearly to 3.00 per cent. in some cases. The iron, being very cold and low in carbon, is naturally very pasty and chills without giving a chance for the escape of the CO formed by the oxidation of the carbon.

It was evident that this iron must contain a great quantity of oxygen, and that if this were really the cause of strength and the other desired qualities in iron it could be secured by making a mixture of this spongy No. 6 and a normal iron. Such a mixture was accordingly melted in the crucible, and test bars made therefrom showed results as strong or stronger than the best iron ever made from the furnace; 1.25-in. round bars on 12-in. cen-

no result, and such as there was, a detriment to the quality. This was repeated several times.

We then began ladle experiments, heating iron ore and other kinds of oxides in the bottom of a ladle before cast time and running iron in on them at cast, stirring up the mixture and pouring test bars and sample pigs. By this means we did close up the grain of the iron and induced a paper chill (that is, a line of white no thicker than a piece of paper around the edge of the pig), which was not present in the regular cast, but when it came to improvement in strength and toughness there was little or none to be observed.

During the early part of this investigation descriptions of the Ledebur apparatus for the determination of oxygen in iron and steel as modified by the chemists of the American Rolling Mill Company were published, and we bought a set of this apparatus and began direct determination of oxygen. This determination in the presence of 3 or 4 per cent. of carbon is a very different matter from its determination in steel, and it took some time to learn all the precautions necessary to secure low blanks and concordant results.

This end, however, was attained in time. We first made a determination of oxygen in some of the spongy No. 6 and found it to contain as high as 0.13 per cent. We then took cold-blast irons and special cylinder irons and found these to range as high as 0.07 per cent. We then took normal charcoal irons and found them to contain only about 0.015 per cent.; foundry coke irons and electric-furnace irons contained none at all. We were unable to secure samples of "wild" coke basic iron such as described above, but I have no doubt that analysis would show the presence of oxygen in this.

#### METHOD OF MAKING REMELTS AND THE RESULTS

As many of the data in this article are derived from tests of remelts, it seems desirable to state that all the remelts mentioned or tabulated in this paper are made in a "coke hole," approximately elliptical in shape so as to take two crucibles at once, and provided with two tuyeres at opposite ends of its long diameter, so that both its crucibles would be subjected to the same intensity of combustion, etc. In all cases where directly comparative results of a given treatment have been sought iron from the same cast has been used in each crucible, melted at the same time, and the two poured within a few minutes of each other; one with, the other without the desired treatment. We have endeavored to get two 2-in. square bars, two 1-in. square bars, and two 1.25-in. round bars, all cast on end, from every such heat, but not having

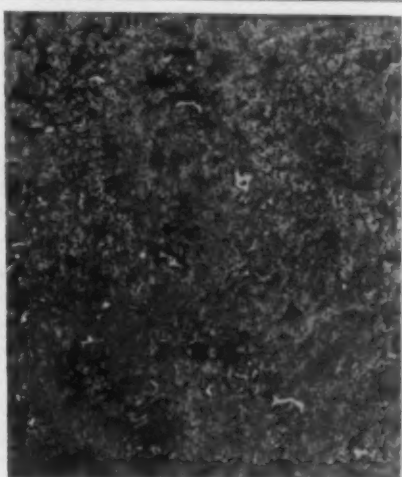
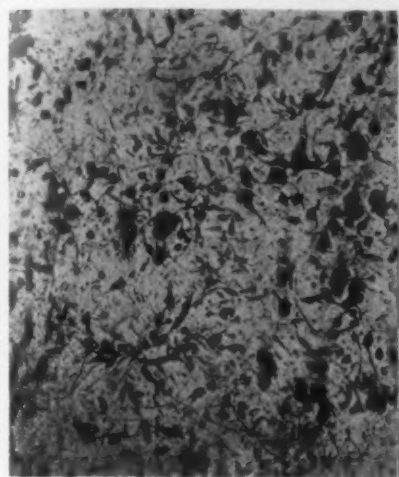


Fig. 13—Unetched

Fig. 14—Etched

Reduced About One-third from an Original Diameter of 100. Remelt. Silicon 1.05 Per Cent. Breaking Strength, 1.25-In. Bar, 3800 and 3700 Lb.

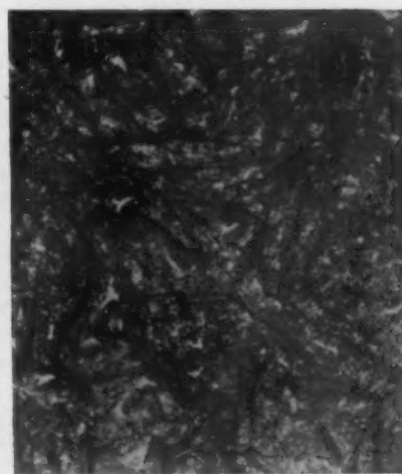


Fig. 15—Unetched

Fig. 16—Etched

Reduced About One-third from an Original Diameter of 100. Remelt. Silicon 1.00 Per Cent. Breaking Strength, 1.25-In. Bar, 2800 and 3000 Lb.

ters breaking up nearly to 5000 lb. as against an average of about 3000 lb. for normal irons.

#### ATTEMPTS TO PRODUCE SPECIAL IRON

It then seemed that we had only to introduce oxygen into the hearth of the furnace to make an iron as good as the best. The easiest way to do this seemed to be to cause irregular working of the furnace and this we proceeded to try out by purposely distorting the filling for several hours. We undoubtedly upset the regular running of the furnace, but the iron was no better, probably somewhat worse than before. We then put a medicine valve on the bustle pipe, filled it with mill scale and blew it into the hearth just before cast time, with little or

a skilled molder on this rather difficult work, we have not always succeeded in getting a complete set of perfect bars. There is also, of course, a variation to be expected in these bars on account of the nature of the material and on account of their being industrial rather than laboratory or refined tests.

We repeated many times the experiment of remelting normal or even very poor ("spotted") irons, with spongy No. 6, and with the same result in every instance, an improvement in the strength up to 50 per cent. or more.

We give in the table a summary of the results on the three pairs of remelts mentioned earlier, which shows their chemical composition and also the strength of the original iron and of the remelts.

It will be seen that in every case those irons which were strong as they came from the furnace retained their superiority after remelting. It will also be seen that the good iron was in each case much higher in oxygen than the corresponding poor iron. To summarize, therefore, we consider that we have proved the following facts:

1. Strong, tough irons of high chilling qualities contain oxygen in appreciable quantities. Weaker irons of similar analysis contain less or no oxygen.



Fig. 17—Electric Furnace Pig Iron

2. Poor and normal irons may be improved beyond recognition by introducing oxygen into them.

As an additional proof that the actual cause of the increased strength of the strong irons was oxygen, we thought it would be well to try the effect of deoxidizing some of these strong irons with recognized agents used for that purpose. We accordingly made various remelts of strong irons which we deoxidized in the crucible immediately before pouring with aluminum in several cases and with titanium in one or two. The results with titanium are confirmatory of the results with the aluminum. The strong irons deoxidized with about 1 oz. of 10 per cent. ferrotitanium per 50-lb. crucible were greatly weakened. We believe that these may be taken as a final and conclusive proof that oxygen in some form not known or understood by us is accountable for the abnormal strength of irons whose analysis as regards other elements is normal.

#### THE CONDITION AND EFFECTS OF OXYGEN

As to the condition in which this oxygen exists, we know nothing. We have been unable to detect

it with the microscope, and we can only assume that it is some oxide of very much lower degree than any with which we are familiar.

Its effects seem to be two-fold:

1. It makes the iron very much more sensitive to chilling influences. One of these good irons if cooled normally will be only slightly harder than a normal iron, and on account of its fine, close grain will machine beautifully, but if the surface be chilled even slightly it begins to whiten up, and with a chill of any strength will be solid white at the edge, where a normal iron of the same silicon would show little chill, or none at all.

2. The other principal effect is shown by the photographs, Figs. 1 to 16, and consists in the extremely fine subdivision of the graphite in the strong irons, contrasting conspicuously with the large, coarse aggregates of graphite in the weak irons. Comparing these photographs of strong irons with those of malleable iron cast white and graphitized by annealing, one is struck with the resemblance, and it is easy to suppose that the effect of oxygen is to raise the solidifying point of the iron relative to the temperature of evolution of the graphite so that the latter, instead of being free in the liquid mass to assume as bulky a form as it chooses, can only form against great pressure and must therefore form in the most compact particles possible, which, in turn cannot coalesce into larger masses because of the resistance of the surrounding medium. These are purely scientific points outside the field of a commercial investigation, and beyond our power to investigate.

#### CONCLUSIONS

1. Irons which contain oxygen to a considerable extent, in a form as yet unknown, are stronger and tougher and have better chilling qualities than irons containing less of this element, but of the same analysis in other respects.

2. Irons may contain a sufficient quantity of carbon to make them rotten and worthless through the predominance of the eutectic structure when deficient in oxygen, and yet, when they contain a considerable quantity of oxygen, be entirely free from this structure and of excellent quality.

3. Furnace conditions control whether the carbon shall be below or above the eutectic ratio and the presence of much or little oxygen, the two dominant factors in the fundamental quality of the iron; that iron, broadly, being the best which is made at the lowest temperature.

4. Charcoal irons can be made at temperatures several hundred degrees lower than are practicable with coke and have a great possible advantage in that respect. This is largely wasted without good furnace work in the broadest sense.

5. Phosphorus up to 0.50 per cent. or more exercises a beneficial influence on the strength of the iron and the depth and character of the chill. Phosphorus also has a tendency to reduce total carbon.

6. Aluminum and titanium tend to reduce the strength and chilling power of the iron by removing its oxygen, but titanium may have an influence independent of this on account of its removing nitrogen also.

7. Chromium and manganese have an almost identical effect in raising the total carbon and throwing it into the combined condition. The latter increases the chill and the strength, but the combined carbon so produced is in the form of eutectic plates, which deprive the iron of much of the strength which it would have with the same combined carbon in the absence of these plates.

8. Chill produced by these elements cannot be



expected to have the same wearing qualities as that produced by elements which do not further the formation of flat plates of eutectic.

As indicated by the author's conclusions, which are given in full, the effect of other elements, such as nitrogen, cyanogen, phosphorus and particularly chromium and manganese, is discussed. The heat balances of different kinds of furnaces as affecting the oxygen content and quality of the iron are gone into fully, as well as a comparison of high oxygen cast iron with malleable cast iron.

Since the completion of this paper Mr. Johnson states that he has made some successful experiments with the object of converting ordinary coke iron into iron of a grade equal or superior to charcoal iron. He claims to have treated 1 per cent. silicon iron so as to introduce oxygen into it with the result that the iron so treated broke uniformly at from 3800 to 4200 lb. on 1¼-in. round test bars as compared with an original strength of 2000 to 2500 lb., that its composition as regards silicon remained the same, and that its chilling power and closeness of grain were equal to the best grades of charcoal iron. The cost of this treatment is claimed to be low, from \$2 to \$5 per ton in proportion to the amount converted. Patents covering this process have been allowed and it is announced that arrangements are now being made to produce this iron as a commercial product.

#### Chicago Pneumatic Tool Company's Year

The annual report of the Chicago Pneumatic Tool Company, covering operations for the year ended December 31, 1913, gives net earnings at \$1,171,245, comparing with \$1,002,261 in 1912 and \$772,527 in 1911. The balance earned for dividends was \$705,697, comparing with \$601,196 in 1912, and \$412,740 in 1911. This is the best showing it ever made.

The income and expense account in detail for three years ended December 31, is given below:

	1913	1912	1911
Net earnings .....	\$1,171,245	\$1,002,261	\$772,527
Less bond interest....	115,000	115,000	115,000
Balance .....	\$1,056,245	\$887,261	\$657,000
Sinking fund .....	50,000	50,000	50,000
Balance .....	\$1,006,245	\$837,261	\$607,527
Depreciation, repairs, etc. ....	300,548	236,065	194,787
Balance .....	\$705,697	\$601,196	\$412,740
Dividends .....	257,951	257,951	257,951
Surplus .....	\$447,746	\$343,245	\$154,789
Previous surplus ....	2,007,181	1,663,937	1,500,143
Total surplus .....	\$2,454,927	\$2,007,182	\$1,663,938

From the surplus thus shown at the close of 1913 the company has reserved \$100,000 against obsolete material and product and permitted subsidiary companies to retain \$105,823 from their profits for working capital, leaving \$2,249,104 final surplus. The bonded indebtedness remains at \$2,500,000.

In his remarks to the stockholders President W. O. Duntley states that the volume of business secured by the company was the largest in its history, although business conditions generally were not particularly favorable, which, together with keen competition, necessitated the marketing of its product on a closer margin of profits. The foreign subsidiary companies are increasing their business steadily, their earnings being retained by them to furnish the necessary additional working capital for their expansion. Conservative amounts have been expended for development work; tools have been improved and new designs have been brought out. Active and increasing competition, both domestic and foreign, make it imperative that the greatest vigilance be exercised in this respect.

## HIGH ECONOMY OF MILL ENGINE

### Steam Consumption Record and Rapid Reversal For a Reversing Mill Engine

Some interesting figures of the performance of a reversing engine installed in the plant of the Youngstown Sheet & Tube Company, Youngstown, Ohio, and bearing on the present severe competition between steam and electricity as the immediate source of energy in such a mill, have been obtained from the Mesta Machine Company, Pittsburgh, Pa., which built the engine. The engine, which was illustrated and described at some length in *The Iron Age* of August 14, 1913, is a 46 and 76 x 60-in. twin tandem compound reversing engine. On November 28 and 29, 1913, a test was made by engineers of the Youngstown Sheet & Tube Company, the Carnegie Steel Company and the Mesta Machine Company and by professors and students of the Carnegie Institute of Technology. The steam consumption of the engine per indicated horse-power hour was found to lie between 20 and 22 lb., depending somewhat upon the method of rolling, so that 21 lb. is taken as the average. As reversing engines have commonly shown a steam consumption of no better than 27½ to 35 lb. per indicated horse-power hour when run condensing, considerable pride is taken in the Mesta engine performance.

The method of controlling the engine was also studied with interesting results. It will be recalled, as noted in the article already referred to, that there is a controlling lever on the engine which operates a relay valve, which valve in turn controls the reversing links and the throttle. The scheme of control is to compel the operator at times of light loads and medium heavy loads to work with a combination of the throttle and the cut off control. Besides showing that the method of control secured the attainment of cut-off, which was indicated by indicator cards selected at random, the efficacy of the control in providing for quick handling of the engine was tested in noting the time for reversals. The average time of change from 60 r.p.m. in one direction to 20 r.p.m. in the other direction was found to be 2.2 seconds. These speeds are those ordinarily found at the end and at the beginning of the passes respectively, so that 2.2 seconds may be called the main interval required by the engine for reversal. As a rule, it is found that the manipulation of the ingot takes a longer period than that required by the engine for reversal.

In making the tests, simultaneous readings were required from fifteen observers, eight of them at the continuous indicators, three on the pulpit, besides one for observing the temperature of the steel, two for observing the elongation of steel and one for taking measurements at the condenser. In addition there was one general overseer of the test, while the weight and chemical composition of the ingot was obtained from the mill and the laboratory. The Mesta Machine Company is naturally proud of the performance, particularly as no keying up, setting up or repairing has been done on the engine since it was started in July, 1913. Mention may also be made of the fact that the condenser during the heaviest rolling kept the vacuum between 27 and 28 in. of mercury, referred to a 30-in. barometer.

The J. C. Busch Machine Works, 136 Ferry street, Milwaukee, has been changed to a corporation styled the J. C. Busch Company. The company manufactures small cranes, radial drills and sprue cutters. No extensions are under consideration at present.

# Interior Transverse Fissures in Rails\*

Conditions in Steel and Rail Production as Well as in Service Regarded as Contributory Causes—Suggestions for Their Prevention

—BY P. H. DUDLEY

Specimens of head failures in basic open-hearth rails due to transverse fissures collected from different roads, sections and manufacture indicate that this latest and rare type is not found in metal of medium composition with ordinary purity and ductility, but occurs only in abnormal metal of decided fragility or limited ductility in the head incident to conditions of fabrication of the rails, which should and can be avoided. This type of failure to date is said to be unknown in three brands of basic open-hearth rail of limited output and rare for two of the large manufacturers. It has been found only in three or four rails for one mill, and one rail out of several hundred thousand in service for another mill. Therefore it is not an accidental product of all mills.

The terms abnormal or heterogeneous metal are intended to be comprehensive and cover segregations, all impurities, inclusions of slag, internal strains, composition and fragility of structure of the metal. Such steel is both chemically and physically heterogeneous in the rail heads, and does not undergo the ordinary steps of manufacture and finish without more or less injury to some "low rail" from the hotbeds, in a fraction of one per cent. of those manufactured. It is this small percentage of rails in which the steel is embrittled in the head



Fig. 1,  $\frac{1}{2}$  Size.—Interior Transverse Fissure, 1.25 x 2.00 in. in head of rail. Nucleus, intergranular. Class of fracture, single, in quarter, between ties, 3 in. from edge of tie plate. Low rail, 2° 47' curve. Fracture head to base. Metal in head, hard and fragile. Scleroscope, 60, in center of bearing surface, with a ductile base. The permanent sets of the gag were traced as slight elevations or curves in the head. The fissures develop as bright surfaces, until the outside metal checks, which admits the air, then the surfaces discolor.

and over-strained in gagging, which makes the investigation so difficult. All previous laboratory reports on one or two fissures have not been sufficiently comprehensive to suggest the combination of conditions of fabrication, which subsequently



Fig. 2,  $\frac{1}{2}$  size.—Interior Transverse Fissure just started; diameter, 0.45 in. Same rail as Fig. 1, which, head down, under the drop, broke 3 ft. 9 in. from the fissure in Fig. 1. Nucleus, intergranular. The lines of final fracture radiate from the nucleus to the exterior metal, which is not as fragile as in Fig. 1. The rail left the hot bed low, with abnormal or heterogeneous metal in the interior of the head in two locations, combined with internal strains of fabrication. The steel in the interior of the head could not elongate proportionately with the surrounding metal under the effects of the gag on the base and the weakened or checked nucleus became the origin of the undeveloped fissure in Fig. 2 by service in the track, as was the case in the developed fissure of Fig. 1.

tend to induce the fissures in service, and how to avoid them in manufacture. Figs. 1, 2, 3 and 4 are good illustrations of induced transverse fissures.

## COMBINATION OF CONTRIBUTORY CONDITIONS

A combination of contributory conditions is required to make abnormal steel. Some of the detailed contributory conditions of manufacture are as follows:

1. Abnormal or heterogeneous metal of limited ductility near the center of the head of the rail with initial strains. This may be from composition or fabrication. It contains by segregation a higher percentage of carbon than specified, and is often overheated. The ferrite may be nearly or all absorbed in 0.70 per cent. carbon steel. The pearlite is usually fragile and renders the texture of the metal sensitive to the wheel loads, while traces of cementite occur in some specimens.
2. The carbon is on the high side of the specifications, or usually above it in the center of the head.
3. Impurities or an inclusion of slag in the steel rolled out in the head.
4. Irregular heating of the ingots on one of their sides for the head of the rails.
5. Cold rolling and rapid chilling of the metal introduce and leave internal strains in the heads between the outside of the metal and the interior, in rolling the section and cooling on the hotbed which embrittle the metal in the head of the section as a girder in the track. It is not uncommon to find two and three rails per melt in some rolling

\*From a report of an investigation of the Interior Transverse Fissures in Rail Heads, made to the president of the New York Central Lines, January 6, 1914, by Dr. Dudley, who is consulting engineer for this railroad system on rails, tires and structural steel.



which have developed the interior transverse fissures in the B, C and D rails, which indicates that cold rolling and irregular cooling on the hotbed are contributory conditions. Rails rolled and cooled on the hotbeds in temperatures near zero are decided contributory causes for the development of interior transverse fissures in rail heads, as some rails may be chilled either in the head or base for summer or winter service.

6. The irregular curves for high or low rails for their entire length or at one end on the hotbed,



Fig. 3,  $\frac{1}{2}$  Size.—Interior Transverse Fissure,  $\frac{3}{4}$  x  $1\frac{1}{2}$  in. Nucleus, type, uncertain. The skin of the ingot for the head is decarburized, and the metal contains impurities which check and flow under the wheel pressures, while the base is more ductile.

show that the cambering and hotbed work, and subsequent gagging in the straightening presses, should be reduced or obviated for the present traffic.

#### CONTRIBUTORY CONDITIONS OF SERVICE

1. The wheel loads should be distributed over the full bearing surface of the head, and not carried on about one-half of the width. Then the increased intensities of the wheel loads induce permanent strains which become injurious and cumulative in the metal for each passing wheel, and destructive deformation occurs.

2. To develop in service the interior transverse fissures from the weakened or checked nucleus of the abnormal metal in the head of the rail, requires one or two years under heavy traffic, and from four to six years under light traffic with summer temperatures when the rails are fully expanded, as the increased thermal stress augments the internal strains of fabrication.

3. The tensile strains in the head of the rails which, from a weakened or checked nucleus, develop the interior transverse fissures in the abnormal metal above described, are only those of the negative bending moments in the wheel spacing of the locomotives and equipment, which normal metal withstands without injury.

4. The way the traffic runs, with or against the direction in which the rails were rolled, must be considered when complete evidence is collected for this type of failure.

#### GRADES OF METAL

To date there seem to be two grades of metal in the heads of the rails in which interior transverse fissures develop:

1. A soft, decarbonized exterior of the bearing

surface of the head, with impurities in the steel, which flows under the wheel loads, and does not sustain their pressures without a disturbance of the metal from  $\frac{1}{4}$  to  $\frac{3}{4}$  of an inch in depth. The top of the head for  $\frac{3}{4}$  of an inch in depth may come off. It has been noticed in several cases, to spread and make vertical sides concave.

2. The metal in other specimens is hard and fragile, of limited ductility in the head, and does not flow, but is readily affected by the wheel load pressures. It checks and cracks underneath the bearing surface in the vicinity or adjacent to the interior transverse fissures, which is conclusive evidence of internal strains in the metal.

There are three classes of rails in which the interior transverse fissures develop:

1. Those in which but one fissure develops and fractures from the head down.

2. Those in which two fissures develop in 4 to 6 feet of the rail length, and one fractures from the head down.

3. Those in which several interior transverse fissures develop at intervals in the entire length, and two or more fractures may occur from the head down at the same time, and pieces become detached. This is the rare but dangerous class.

#### CONING OF THE WHEEL TREADS

These fissures did not develop in Bessemer steel rails when the coning of the wheel treads was 1 in 38, even after the axle loads of the drivers had reached 55,000 to 60,000 lb. and 36,000 to 38,000 lb. for the 50-ton loaded coal cars. The few fissures in Bessemer rails which after 10 to 23 years' service developed in the past two or three years, were since the coning of the wheels of the freight equipment of 1 in 20 became general.

The Bessemer rails in which the fissures were found after 23 years of service, were the pioneer 5-inch 80-lb. section for the New York Central & Hudson River Railroad. They were straightened under the presses on supports 28 to 30 inches apart



Fig. 4,  $\frac{1}{2}$  Size.—Interior Transverse Fissure,  $1\frac{1}{2}$  x  $1\frac{1}{2}$  in. Nucleus, spherulitic and soft. Metal hard, with limited ductility in the interior of the head, combined with internal strains

before I went to the mills in 1891 and had the supports widened to 40 and 42 inches for the stiff rails of 5 to 6 inches in height. The heavy gagging in those two rails in which fissures developed became an important clue to their injury, while being straightened. The permanent set of the metal in

the head due to the gag on the base, could still be identified.

The Scleroscope scale of hardness ranges from 48 to 52 in the center of the bearing surface, and by the Brinell, 296, while  $1/16$  of an inch beneath it is 277. This is hard, but it required the checked nucleus—now an empty conical cavity—and the recent heavy wheel loads concentrated on the gauge side, to develop the fissures during the rails' long service.

The standard coning for the wheel treads of the New York Central Lines for the past 18 months has been a return to the former 1 in 38, for the tires of the locomotives, and for the solid steel wheels and tires for the passenger equipment. Old tires and wheels are re-turned to the contour of 1 in 38 as the equipment goes through the shops. Means are being taken to secure similar action by the Master Car Builders' Association for the new cast-iron wheels for the freight equipment. This is for the purpose of having or permitting the wheel

2. Its counterpart, the negative bending moment in the wheel spacing.

The above distribution of the wheel effects produces the transitory deflection of the track from the trackman's surface to its equilibrium depression, until its reaction equals the action of the superimposed loads of the wheel bases of the passing equipment. Each fissure starts from a weakened nucleus of abnormal or heterogeneous metal, just above the midway depth of the head, and develops by the tensile strains of the negative bending moment in the wheel spacing for the wheel bases of the passing equipment. These strains vary from one-fifth to one-third of those in the base of the rail for the positive bending moment directly under the wheel loads, according to its section modulus.

The tensile strains in the head of the rail which occur only in the wheel spacing indicate that the most rapid development of the interior transverse fissure will take place in the summer or autumn

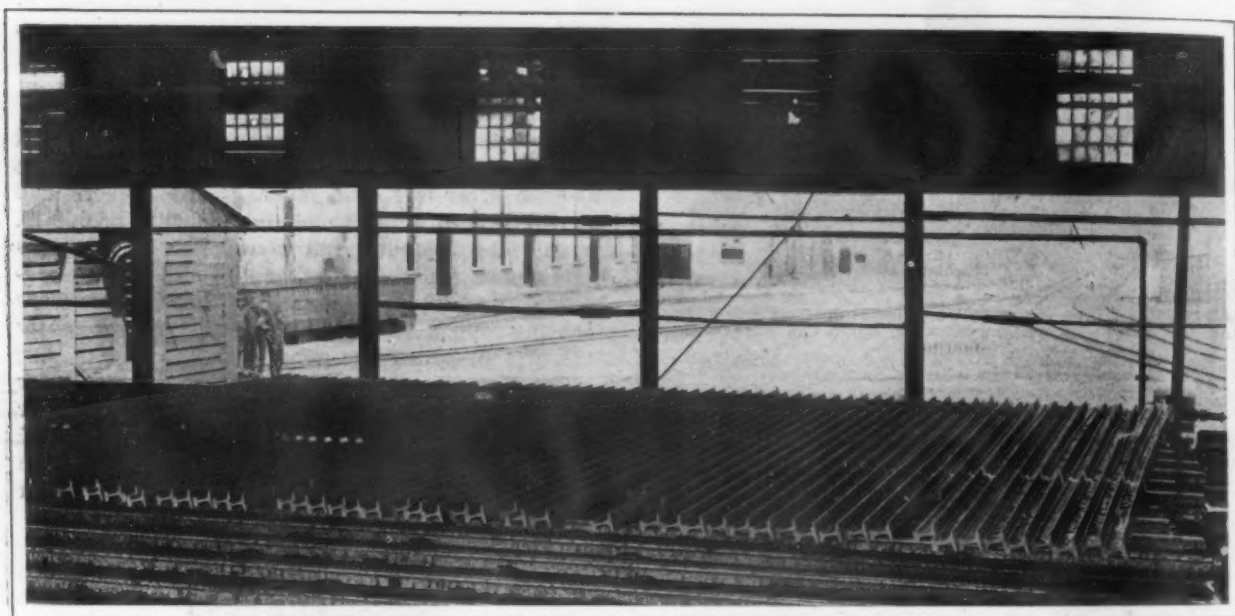


Fig. 5.—One Quarter of a Hotbed with Cooling Rails

treads to cover and distribute their loads to the full width of the bearing surface of the head under moderate wheel pressure intensities for favorable action between the wheels and rails. It prevents delivering a concentrated load to less than one-half of the bearing surface of excessive wheel pressure intensities, which have a tendency to induce destructive action of metal from both the wheels and rails.

#### STRESSES IN THE BASES OF RAILS

You are familiar with the fact that the spans of the bending rails under the wheel loads are governed by the wheel spacing instead of that of the cross-ties, and the section of the rail resolves the moving wheel effects in the head and base, into longitudinal strains as follows: Compressive strains in the head, and tensile in the base, directly under the wheels, which reverse at the points of flexure in the wheel spacing, the head being in tension, and the base in compression.

The wheel load effects as above indicated, are distributed by the rail section in two parts, as follows:

1. The positive bending moment under the wheel loads.

temperatures when the rails of abnormal metal are expanded, or under thermal stress, which augments any initial stress in the interior of the rail heads.

The bright surfaces of the interior transverse fissures show that the interior of the head is under so great initial tension, even when it is in compression directly under the wheel loads, that the broken nucleus does not come together, but the upper and lower surfaces may touch in the bending of the rails under the passing wheel loads. The fissures develop as thin, lenticular spaces, which interrupt the longitudinal strains, and set up stresses at right angles in the metal of the head, which augment their development. A fissure started in the head from the weakened nucleus may continue to enlarge during the cold weather before the rails under tension can render in the splice bars.

The interior transverse fissures which occur in tires having initial strains of fabrication develop as lenticular spaces from the shrinkage strains of the metal on the wheel centers to hold them in position. The surfaces of the fissures do not show any indication of ever being in contact after they are checked.

To date, apparently, five varieties of nuclei are



being studied: Intergranular, spherulitic, non-ductile metal, slag inclusions, and impurities, which seem to be associated with metal having internal strains in the interior of the head. The subsequent development of the fissures seems to be intracrystalline with slight selective exceptions. The nuclei which can be checked or weakened under the gag, as a rule, are too minute for chemical analysis, and are studied under the microscope. The non-ductile metal may only disclose checks or cracks and impurities.

#### CAMBER OF THE RAILS AND THE HOTBEDS

The rails should be cambered according to temperatures when they leave the hotsaws, as the automatic machines over or under camber many rails, which increases the work required under the straightening presses. The recalcence of the base of the cooling rails on the hotbeds, straightens the rails in a few seconds, and then reverses the camber. This is followed by the recalcence of the head which re-straightens the rails and soon increases the original camber. Then as the rails cool, they retain more or less vertical and side curves. These irregularities are increased when the hot rails are bunched on the hotbed to cool, and some rails go to the straightening press, high or low for their entire length, or high or low at one or each quarter; and internal strains are sometimes left in the rail heads.

The spacing of the rails on the hotbeds is of great advantage, for the rails cool more uniformly and require less blows under the straightening presses than bunched rails on the hotbeds, as the average number of extreme high or low rails is often 20 to 40 per cent. greater. Fig. 5 shows a hotbed on which the rails (3 per ingot), were bunched and are close together, though most of them have cooled nearly straight. The A rail of the ingot is on the outside in the right-hand corner of the hotbed, and high in the center, while the B and C rails have reverse curves at the quarter of the outside ends exposed to the air, the head being low near the end in each rail. A low rail for its entire length does not show on the hotbed, but one is represented in Fig. 6.

To straighten such a rail, the base must be shortened and the head lengthened by the gag in the straightening press, cutting the long curve into a series of short curves. The gag puts a permanent set through the entire section of metal where applied, of compressive strains in the base, and tensile in the head. When a rail with abnormal metal in the interior of the head is gagged, the possibility of a checked or weakened nucleus is made clear by the illustration in Fig. 6.

The combination of contributory conditions indicated may localize and reduce the ductility of short portions of metal in the rail head to one per cent. or less per inch in one or more places, while either side the ductility may be ample for service, though in an occasional rail the fragility in the head extends its entire length. The metal in the base of the same rail may also have 6 to 12 per cent. of ductility. The base of some rails, in which fissures have developed in service, can be sledged and bent 40 to 60 deg. without fracture.

It is these variations in quality of the metal of

the head in short distances with a more ductile base which has made the investigations so laborious and difficult to trace the combination of contributory causes of manufacture and service, that induce or permit the fissures to occur.

#### PREVENTION OF INTERIOR TRANSVERSE FISSURES

To prevent the development of interior transverse fissures in the rail heads under service, the combination of contributory causes cited must be avoided.

1. The rail head must have sufficient ductility to undergo the ordinary operations of manufacture without injury.

2. The rails must perform the functions of girders in the track and subdivide, by the section, the wheel effects into their negative bending moment in the wheel spacing and the positive bending moment directly under the wheels.

The metal must be well purified in making the steel, and segregation prevented in the setting ingots, to give practically the ductility incident to a suitable chemical composition. This has been done in the manufacture of hundreds of thousands of tons of basic open-hearth steel rails, with prevention of interior transverse fissures under modern traffic.

The present types of ingot should be rectangular, massive, short and stubby, the length under three times the largest dimension of the base. The minor or interior shrinkage of the ingot is proportionately less than in the small base and long ingots, and segregation is reduced in the steel which sets quiet in the molds, due to its composition under fair mill practice.

To insure pipeless rails with present form of molds, the ingot, as soon as the metal caps on top, should be promptly stripped and charged into the reheating furnaces before the minor shrinkage cavity barely starts in the top of the ingot, and appears only as a trace in the bloom, which is removed in the discard. Provision is made for the major or exterior shrinkage of the hot ingot to cold metal, by the templets for the passes, and does not require other attention.

The ingots should not be overheated on the sides which form the head and base, nor should the blooming check the skin of the ingot for either of those members.

The reduction and elongation in the three

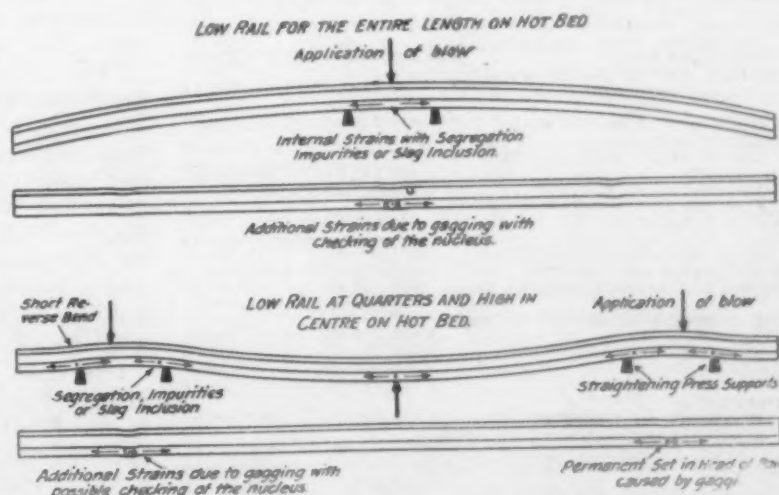


Fig. 6—Contributory Effect of Straightening Rails to Induce Interior Transverse Fissures

passes before the finishing should not be too great, otherwise internal strains in the center of the head may be left in rolling. There is also a tendency on

the part of some manufacturers to increase the number of passes in the rail trains.

The most numerous developments of the interior transverse fissures in rail heads have been in those which were rolled cold under direct rolling, the saws set 33 ft. 6 $\frac{1}{8}$  in. for 100-lb. rails, but less for lighter sections, and the rails bunched on the hotbeds. This fact of injury to the metal as a girder by cold rolling has been ascertained by repeated tests in steel which should give 14 to 16 per cent. ductility in the base, but was reduced to less than 4 per cent., and under 1 per cent., in the head of the chilled and embrittled metal.

The rails should not be rolled too hot, for then the texture is also injured.

It will be possible in abnormal or heterogeneous metal in a gagged butt with a weakened or checked nucleus to start an interior transverse fissure, by a series of several thousand light blows at the mills. Metal without segregation, impurities and internal strains, will not develop the interior transverse fissures. This new test made occasionally at the mills will aid the maker and consumer to obtain normal metal in the finished rail.

The detailed information above will enable the manufacturers to co-operate and prevent the combination of contributory causes of fabrication, and avoid, by service, subsequent development of the interior transverse fissures in the rail heads. It is just as important for the manufacturer as the consumer to comprehend the principle that the rail section is a girder in the track to distribute to the crossties, ballast and roadbed, the moving wheel loads, and, to perform its functions with safety, requires ductility in the head as well as in the base.

## REPUBLIC IRON & STEEL CO.

### Annual Report for the Year 1913—Profits Second Largest in History of the Company

The fourteenth annual report of the Republic Iron & Steel Company, which has just been issued, gives the results of operations in the fiscal year ended December 31, 1913. Following is a comparative statement of income:

	1913	1912
Net earnings from operations, after deducting charges for maintenance and repairs of plants, amounting to \$1,654,573.30 in 1913 and \$1,757,180.08 in 1912.....	\$4,958,341.84	\$3,484,613.35
Interest and dividends received, less interest paid.....	66,940.50	130,694.98
Total profits for the year.....	5,025,282.34	3,615,308.33
Less provision for:		
Depreciation and renewal of plants.....	600,887.61	339,341.76
Exhaustion of minerals.....	241,004.24	215,449.14
Possible shrinkage in value of raw materials.....	220,000.00	.....
Total depreciation allowance...	1,061,891.85	554,790.90
Net profits for the year.....	3,963,390.49	3,060,517.43
Deduct interest on bonds and notes.....	862,090.43	826,940.90
Net profits applicable to dividends.....	3,101,300.06	2,233,576.53
Add surplus December 31.....	6,661,477.58	5,286,218.16
	9,762,777.64	7,519,794.69
Deduct:		
Dividends on preferred stock...	1,750,000.00	437,500.00
Special appropriations from surplus.....	1,500,000.00	420,817.11
	3,250,000.00	858,317.11
Net surplus carried to balance sheet.....	\$6,512,777.64	\$6,661,477.58

Net current assets December 31, 1913, were \$11,155,484.25. Accumulated dividends on the preferred stock, after the deduction of 1 $\frac{3}{4}$  per cent., payable January 1, 1914, aggregated 5 $\frac{1}{4}$  per cent.

The gross volume of business indicated by ton-

nage shipped showed some falling off on account of interruptions to operations in the first quarter of the year, as a result of extraordinary Ohio floods, and to the contraction in business which so seriously affected operations for the last quarter. Comparative figures are as follows: 1913, \$31,937,059.20; 1912, \$32,319,774.36; 1911, \$25,638,004.68.

The balance sheet December 31, 1913, which is a very full presentation, is condensed as follows:

Assets	
Cost of properties and investments.....	\$69,178,649.85
Cash with trustee for bond redemption.....	91,794.77
Current assets:	
Inventory of manufactured products, material and supplies.....	7,454,744.51
Ore contract payments represented by ore at docks.....	768,769.79
Accounts and bills receivable after reserve for doubtful accounts.....	3,777,611.38
Cash.....	1,827,098.16
Total current assets.....	13,828,223.84
Expenditure for mine stripping, advanced royalties, etc., chargeable to future operations....	682,396.91
Total.....	\$83,781,065.37
Liabilities	
Common stock issued.....	\$27,191,000.00
Preferred stock.....	25,000,000.00
First mortgage bonds outstanding.....	962,000.00
Sinking fund mortgage bonds outstanding.....	13,305,000.00
Potter Ore Company bonds.....	293,500.00
Bonds and notes on Martin & Palos Coke Works.....	354,095.60
Collateral notes due June 2, 1914.....	1,500,000.00
Dividend warrants payable October 1, 1914, and October 1, 1915.....	374,316.00
Current liabilities:	
Accounts payable.....	1,596,097.79
Cash received in excess of value of ore shipped to customers.....	204,073.06
Taxes accrued.....	226,060.08
Interest accrued.....	206,262.91
Dividend on preferred stock, payable January 1, 1914.....	437,500.00
Unclaimed dividends.....	2,745.75
Total current liabilities.....	2,672,739.59
Funds:	
Exhaustion of minerals and mining equipment.....	\$1,772,905.06
Depreciation and renewal of plants.....	2,988,310.40
Relining and rebuilding furnaces.....	346,983.75
Fire and accident insurance.....	332,990.71
Contingencies.....	174,446.62
Surplus.....	6,512,777.64
	\$83,781,065.37

Comparative figures of production are given as follows, in gross tons, except as noted:

	1913	1912	1911
Iron ore.....	1,743,504	1,828,083	1,798,258
Coke (net tons).....	855,814	883,247	766,475
Limestone.....	105,549	52,830	71,514
Pig iron.....	895,949	1,035,593	921,779
Bessemer steel ingots.....	611,833	682,285	627,250
Open-hearth steel ingots.....	347,488	354,008	137,184
Total steel ingots.....	959,321	1,036,293	764,434
Finished and semi-finished products.....	955,478	1,039,517	817,848

The theoretical blast-furnace capacity of the company is now 1,195,000 tons per annum and its steel-ingot capacity is 1,150,000 tons.

The active iron and steel plants now comprise the Brown-Bonnell Works, Youngstown Steel Works (Bessemer), Haselton Steel Works (open hearth), Haselton Rolling Mills, Haselton Steel Tube Works, and Shafting Works, all at Youngstown, Ohio; Indiana Bolt Works, Muncie, Ind.; Inland Works, East Chicago, Ind.; Sylvan Works, Moline, Ill.; Haselton (4) furnaces, and Hannah furnace, Youngstown, Ohio; Hall furnace, Sharon, Pa.; Atlantic furnace, New Castle, Pa., and Pioneer (3) furnaces, Thomas, Ala. The total number of blast furnaces is 10.

Reserves of ore are based on diamond drill estimates. Further exploration and development work in the Southern district have convinced the management that some of the land the company has heretofore carried in its estimates for ore reserves does not contain workable ore, and the reserves shown below, in gross tons, have been reduced to very conservative figures:

Year	North	South	Total
1913.....	51,794,388	71,333,556	123,127,944
1912.....	50,933,667	87,846,032	138,779,699

Work on the by-product coke plant at Youngs-



town has been continued during the year, and the plant is now nearing completion and is expected to be ready for operation by April 1. Upon its completion the company will be entirely self-contained on coke. At the Republic Mine in Pennsylvania considerable work has been done to increase the output so as to insure a full and sufficient coal supply for the by-product ovens. A new coal mine has also been developed in the Klondike district in the same State.

Every practical precaution against accidents in the company's mines is being taken, both North and South, and schools of instruction in first aid and rescue work are being maintained. Local chapters of the American Mine Safety Association and night schools under the direction of competent teachers have been installed at various points.

In recognition of the responsibilities carried as employers, and to minimize the risk of employment, the policy adopted for the preceding year of liberal expenditures for the installation of safety devices, better sanitary facilities—such as pure drinking water, ventilation, locker-rooms, shower-baths, dry and change houses, both for the mines and mills, better conditions of housing for employees, etc.—have not only been maintained, but increased expenditures have been appropriated for carrying out a more extensive sociological programme, it having been demonstrated that the efficiency of the worker has been increased and that accidents have been minimized.

The amount expended for labor in 1913 was \$9,999,263.24, against \$9,119,457 in 1912. The average expended per man was \$792 in 1913 and \$741 in 1912.

The tonnage of unfilled orders for finished and semi-finished products on hand December 31, 1913—120,959 tons—is in strong contrast with the balance on hand December 31, 1912—613,053 tons. At the present time, however, there are strong indications that a buying movement of substantial proportions is under way.

Chairman John A. Topping, in his accompanying remarks, says in part as follows:

"The satisfactory character of business indicated by the semi-annual report for the period ended June 30, 1913, together with suggested prospects of continued prosperity, was not realized in the last half of the fiscal year; on the contrary, shortly after July, a business recession was in evidence, and in the latter part of August active liquidation, both in value and volume, was under way. Emphasis to this situation was given in October, values and tonnage of new business reflecting a renewed feeling of business disturbance and lack of confidence, stimulated in part by the discussion and passage of the tariff act on October 3. This situation was intensified somewhat by the discussion and recommendation of other legislation which, it was feared, would be as radical in character as the tariff bill. With foreign markets upset and in process of liquidation, and our markets disturbed by domestic matters, earnings and volume of business for the last half of the year naturally declined. Furthermore, the unsatisfactory condition of the foundry pig-iron market, covering the first half of the present fiscal year, continued throughout the year, the last half, however, suffering further shrinkage in value and volume. The net profits of the company, however, notwithstanding the serious flood losses suffered during the first quarter, and the shrinkage in the last quarter incident to adjusting our business to new tariff conditions, for the twelve months ending December 31, 1913, were the second largest in the history of the company, being

exceeded only during the boom or high-priced period of 1907.

"The various improvements and extensions referred to in the semi-annual report of June 30, 1913, as in process of construction, have all been completed and successfully operated, except the by-product coke works, which will be placed in operation about April 1. In general, it may be stated that the programme of increased capacity and reconstruction incident to the change in the company's business from that of manufacturing principally iron to that of the exclusive manufacture of steel, as authorized in 1906, involved substantially the entire replacement of the rolling mill equipment of the company, as well as an increase of 150 per cent. in steel capacity, also the general rehabilitation of the blast furnaces and the iron and coal mining properties; therefore, hereafter improvements will be confined entirely to new capacity and extension of facilities to manufacture the more highly finished products and to improvements suggesting economic refinement in production. In view of the extraordinary character of the replacements incident to the reconstruction period referred to, the executive committee decided that it would be proper to appropriate from surplus \$1,500,000 to apply on account of extraordinary depreciation and extinguishment, in addition to which there has been written out of profits covering depreciation for the year ending December 31, 1913, the sum of \$600,887.61."

#### Niles-Bement-Pond Company's Year

President R. C. McKinney's report to the stockholders of the Niles-Bement-Pond Company states that its profits, including companies controlled by it, for the year ended December 31, 1913, after charging off all expenditures for patterns, drawings, fixtures and ordinary repairs, were \$1,104,114.23. From this deductions were made as follows:

Direct loss by flood at Hamilton.....	\$165,600.32
Set aside for depreciation.....	75,000.00
Regular preferred dividends.....	303,444.00
Common dividend, March, 1913.....	127,497.00

The amount added to surplus was \$432,572.91. Expenditures for extensions during the year were confined to work begun more than a year ago. Extensive improvements at Hamilton have been completed so that the company is able to build the very largest machines for which there is any demand.

Business for the year, while below normal, was better than in either of the two years preceding. The volume at the several works varied from 60 to 85 per cent. of their capacity, but a considerable part of the business was taken at material reductions from regular prices. Export shipments were unusually large in amount. The railroads, which are the company's principal customers, have not been active in their purchases the past year.

President McKinney adds: "I now feel that it would have been better had we reduced the rate of dividends on our common stock during the years 1911 and 1912. The payment of dividends at the regular rate during those years now makes it seem unwise to pay further dividends on the common stock until increasing business shall result in releasing part of the company's funds now employed in carrying an abnormally large inventory."

A manganese steel crossing of record size has been manufactured by Edgar Allen & Co., Ltd., Sheffield, England, for the Buenos Aires Great Southern Railway. The rails weigh 100 lb. per yd., and the layout comprises eight sets of 18-ft. switches, four sets of 12-ft. switches, two acute, 14 obtuse and two compounded triple crossings and closure rails, the whole thus including eight turnouts and eight diamonds. The total length is 432 ft. 1 1/4 in., while the width at one end is 63 ft. 1/2 in. and the other 64 ft. 3 1/2 in.

# Warm-Air Register Making at Battle Creek

## Arrangement of a Plant Stamping the Registers from Sheet Steel and Enameling or Plating the Formed Product

The manufacture of warm-air registers from cast iron in the factories of the United States Register Company, Battle Creek, Mich., was supplanted some time ago by an installation of modern machinery for their manufacture from stamped steel. When the equipment is finally completed the factory will have a capacity for manufacturing 1500 registers per day. The accompanying general plan will give an idea of the extent of the plant.

The chief of the several buildings comprising the plant is a two-story fireproof brick building measuring 175 x 220 ft. This building houses the general and private offices, the machine shop, tin shop, assembling department, stock and shipping rooms, while the second floor is devoted to the storage of furnace fittings and wooden cold-air faces. The connecting buildings are divided into departments for plating, polishing, japanning and buffing the registers manufactured on the premises.

In the manufacture of these registers from stamped steel, the company has installed machinery of a special type and dies for its designs. The stamping machines are single-gear friction clutch presses manufactured by the Consolidated Press & Tool Company, Hastings, Mich.

The company's products include the National register and other designs, especially the Jones register used in connection with the Jones system of heating and ventilating. These side-wall registers are made in two parts, a register and a border or frame. The frame when completed and ready for installation fits against the plastered wall where the register box presses through the opening. The center, or register proper, fits over the opening of the box and is attached to it by means of two lugs at the top and one or two bolts at the bottom.

Either 0.044 or 0.050 gauge steel is used. The raw material for these registers arrives at the factory in cases weighing approximately 600 lb. and in several sizes. The sheets average in length from 80 to 91 in., and in width from 14 to 17 in. The preliminary work in manufacturing consists in the main of purely mechanical operations on the stamping and punching machines, though particular care has to be taken in each operation in order that the register frame or design be true to form and size.

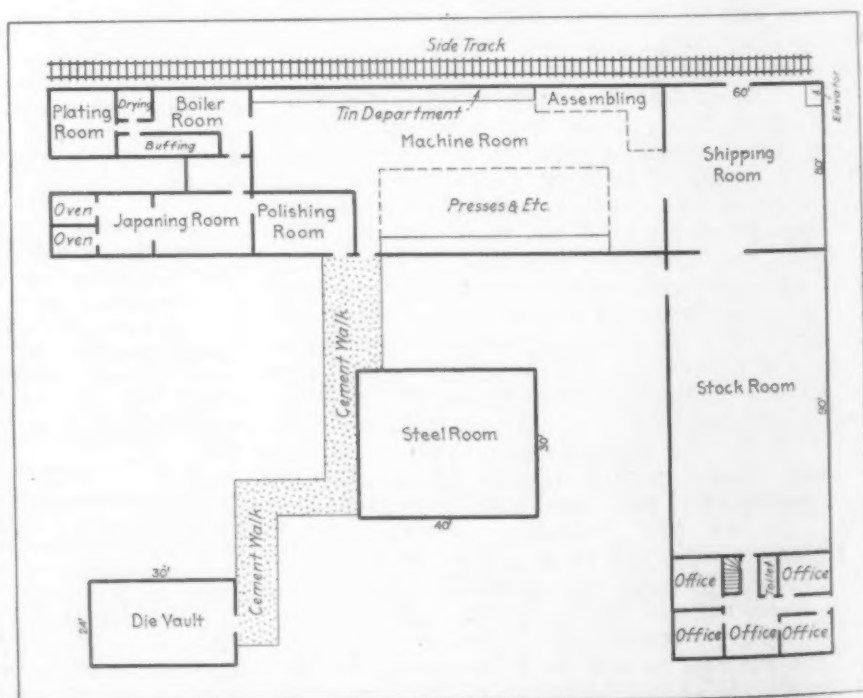
From the large sheets the metal for the frames and faces are cut to size, after which they are placed under a punch press. The corners of the blank are then trimmed round, and the blank is then placed beneath a forming die and pressed into the shape required. The whole center of this stamping is then cut out, while at the same time the holes are punched in the lower part of the frame for screwing on the face in the assembling department.

In manufacturing the face design the sheet metal passes through four operations. The sheet is first stamped with the design required and then embossed and perforated. The edges are then trimmed. On the top edge there is considerable margin that is trimmed with the exception of two lugs that are left so that the face may fit snugly into the frame. In fastening several parts an electric welding machine is used to advantage.

In responding to an increasing demand for registers of many finishes, the company's output consists of such finishes as black japanned, white enamel, nickel, brush and polished brass, and oxidized copper.

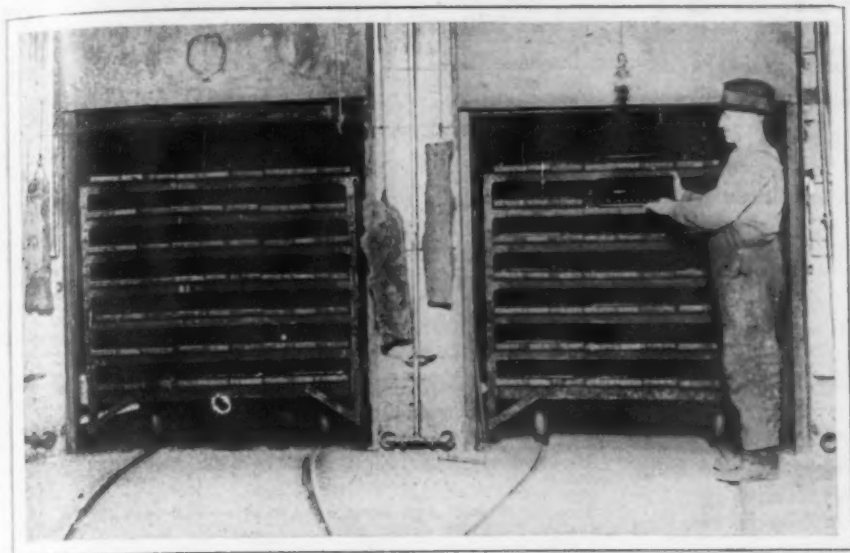
In the polishing department five men are engaged on polishing wheels, removing all marks on the register faces and frames. The registers are piled in neat order both before and after polishing, after which they are taken to either the japanning or plating divisions. The men in this room work under sanitary conditions. The japanning department, adjoining the polishing room, is divided into two sections, one for japanning the registers and the other for baking them in the ovens, a view of the latter being shown in an accompanying illustration. The tank into which the registers are dipped is placed between two sloping troughs, one on each side of the tank. When the registers have been thoroughly dipped in enamel they are hung above the troughs so that the drippings may run back to the tank.

The cars to the ovens run on tracks that continue in to the japanning department. When the registers are thoroughly dry they are loaded on to the cars. Each car has 7 shelves, with 6 trays, making a total of 42 trays to each car. When the cars are loaded they are wheeled into the ovens, which are 9 ft. long and 6 ft. high. The ovens are heated by gas, the jets running round the two sides and back. An



Plan of Factory of United States Register Company





Ovens Used in Enameling Registers

average temperature of 450 deg. F. is maintained in the ovens. The registers are left to bake for 3 hr., after which they are taken to the assembling department. There is also another oven for the dampers, or reflectors. The oven holds about 1000 of these devices, which are suspended on hooks during the baking period and not laid down as in the case of the frames and faces. The screws used in the assembling department are also japanned.

The oxidized-copper, nickel and brass finishes given to the various registers are the work of the plating department. The solution for copper plating is composed of 1 lb. of cyanide of potassium, 9 oz. of ruby oxide, which is an electrically precipitated oxide of copper, and  $\frac{1}{2}$  oz. of sastanol, all being dissolved thoroughly in 1 gal. of water. There are several copper anodes through which electric current passes, each anode being 25 in. long, 9 in. wide and  $\frac{3}{8}$  in. thick. Before the registers are plated they are thoroughly washed and are then hung in the plating bath for 1 hr. and 20 min.

In brass plating the registers are first plated with copper after which they are submerged in a solution containing 3 oz. of carbonate of soda, 6 oz. of ruby oxide, and 10 oz. of cyanide of potassium to 1 gal. of water for a period of 65 min. In the nickel-plating process there is one preliminary coating of copper, after which the registers are hung in the tank for  $1\frac{1}{2}$  hr. The oxidized-copper operation is probably the simplest. After the registers have a copper coat they are suspended but a few minutes in the oxidization bath during which they turn various colors before finally reaching their grayish-black appearance. This oxidized finish does not remain entirely for the registers are taken to the buffing department where they are burnished to show the copper surface beneath. The frames and faces are finally dried and shellacked.

The stock room measures 60 x 90 ft., and is divided into numerous sections with shelving on which each register is carefully wrapped and protected from dust and dampness. The shipping department is a room 60 x 80 ft., well lighted and supplied with wide benches and equipped for the despatch of registers in a protective and substantial manner. The company has a private siding with direct connection to several important railroads.

The map of the plant shows a building at the extreme left. This is known as the die house. It is of fireproof construction and measures 18 x 24 ft. Two-tier shelves run round three sides of the room stocked with various dies used in the design stamp-

ing. The dies are heavy and have to be conveyed to and from the machine shop by a portable crane.

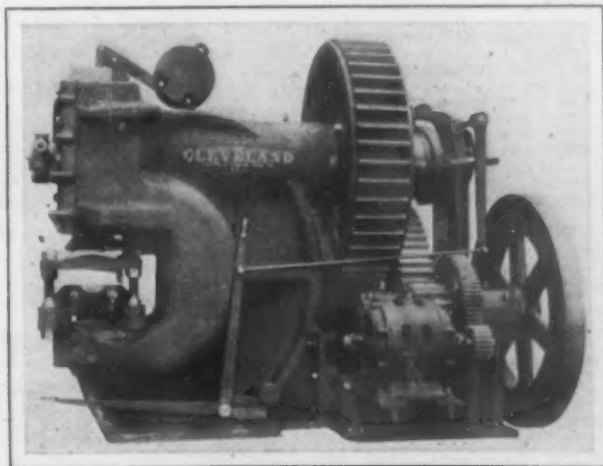
The offices of the company in the main building consist of one general and four private offices, all heated from a warm-air furnace in the basement. Hot-water connections are made by a coil in the firepot for furnishing warm water for use in the lavatory and wash rooms.

The Jones registers were invented in 1901 by the company's secretary-manager, A. O. Jones, who was also the organizer of the United States Register Company. The manufacture of the registers in cast iron was abandoned in 1903 and pressed steel substituted.

This necessitated the building of larger quarters and in 1903 the company purchased the three acres on which the plant now stands. In 1906 the company opened a branch factory and office in Minneapolis, and the following year, on account of increasing business, a branch was started in Kansas City, Mo. Two years ago an Eastern office was established at Albany, N. Y., and present contemplations are for the opening of an extreme Western office in Portland, Ore., within the next twelve months.

### A Heavy Open-Gap Shearing Machine

A special design of heavy compact motor-driven open-gap shearing machine of somewhat unusual size was recently built by the Cleveland Punch & Shear Works Company, Cleveland, Ohio, for the Pennsylvania Railroad. This will be used by the purchaser in its shops at Altoona, Pa., for shearing 0.40 per cent. carbon steel bars, measuring 3 x 12 in. The frame of the machine is of steel and its construction follows the builder's solid type closely. All bearing or sliding surfaces have bronze bushings. A 35-hp. direct-connected compound wound motor, operating at a constant speed is employed to drive the machine, the power being transmitted to the driving shaft through steel gears and pinions with cut teeth. The face width of the main gear is 20 in. and the pitch is 5 in. The width of the horse-shoe gap is 48 in. and the depth is 22 in. The weight of the machine is approximately 90,000 lb.



A Special Heavy Compact Open Gap Shearing Machine Equipped with Constant-Speed Motor-Drive

## FOREIGN IRON TRADE IN 1913

Year's Totals Show That Exports Decreased 6 Per Cent. and Imports Increased 41 Per Cent.

According to the December report of the Bureau of Foreign and Domestic Commerce the total value of exports of iron and steel and manufactures thereof, not including ore, for the year 1913 was \$294,435,060, against \$289,128,420 for 1912. A total of 2,760,133 gross tons of commodities, for which the weight is given, was exported in 1913, as against 2,947,597 tons in 1912. Total imports are valued at \$33,601,222 for 1913, against \$29,328,709 for 1912. The increase in imports is largely in pig iron, scrap iron, billets, rails, and tin and terne plates. The loss in exports is for the most part in billets, nails, spikes, bolts and nuts, and iron sheets and plates. The increase in value of the exports is notable; and not less interesting is the fact that while the tonnage of commodities for which the weight is given increased 41 per cent., the value of the total imports increased only 15 per cent.

The items for December show an increase of 20,000 tons in iron and steel exports, exclusive of iron ore, for December, 1913, over November. The value of the total exports for December, 1913, was \$22,616,701; for December, 1912, it was \$23,750,864; for the months preceding last December it was as follows: November, \$20,142,141; October, \$25,189,745; September, \$22,831,082. Similar imports for December, 1913, show 26,452 tons, against 25,810 tons for November and 21,231 tons for December, 1912. Total December imports were valued at \$2,814,774, against \$2,495,093 for November.

Details of the exports for the same articles for December and the entire calendar year, 1913, compared with the same periods for 1912, are as follows:

## Exports of Iron and Steel

	December		Twelve months	
	1913 Gross tons	1912 Gross tons	1913 Gross tons	1912 Gross tons
Pig iron .....	25,440	24,011	277,648	272,676
Scrap .....	7,689	9,326	97,429	105,965
Bar iron .....	652	2,234	16,615	21,926
Wire rods .....	7,451	6,984	61,682	64,978
Steel bars .....	14,911	16,350	211,716	208,213
Billets, ingots, and blooms, n.e.s. ....	2,232	22,454	91,847	294,818
*Bolts and nuts .....	1,890	1,591	22,737	19,986
Hoops and bands .....	1,419	1,415	16,818	12,557
*Horseshoes .....	114	102	1,247	1,510
Cut nails .....	387	540	3,790	9,311
*Railroad spikes .....	580	1,160	11,329	16,808
Wire nails .....	3,063	4,281	43,637	68,319
All other nails, including tacks .....	359	377	3,970	8,198
Pipes and pipe fittings .....	21,698	18,330	301,790	249,856
Radiators and cast-iron house heating boilers .....	490	640	8,064	5,912
Steel rails .....	22,518	35,279	460,553	446,473
*Galvanized iron sheets and plates .....	3,799	10,273	77,657	169,512
All other iron sheets and plates .....	196	2,542	21,768	124,207
Steel sheets and plates .....	12,694	18,695	223,635	150,721
*Steel plates .....	10,072	12,180	140,634	113,601
Steel sheets .....	37,754	25,215	416,264	166,480
Structural iron and steel .....	3,596	4,534	59,018	288,164
Tin and terne plates .....	7,863	6,769	82,051	81,694
Barbed wire .....	8,856	10,657	108,234	96,059
All other wire .....				148,653
Totals .....	195,723	235,939	2,760,133	2,947,597

\*Not separately stated prior to July 1, 1912.

†Figures cover period since July 1, 1912.

‡Figures are for January to June, inclusive.

Export tonnages for each month in 1913 are as follows:

Months	Gross tons	Months	Gross tons
January .....	249,523	July .....	237,157
February .....	241,880	August .....	209,855
March .....	257,321	September .....	213,055
April .....	260,433	October .....	220,493
May .....	242,192	November .....	175,514
June .....	243,188	December .....	195,723

The monthly totals of tonnage imports in 1913 are as follows:

Months	Gross tons	Months	Gross tons
January .....	21,739	July .....	39,694
February .....	24,903	August .....	18,740
March .....	27,247	September .....	19,939
April .....	26,742	October .....	20,824
May .....	28,572	November .....	25,810
June .....	36,597	December .....	26,452

The details of imports of the same commodities for December and for the whole calendar year, 1913, compared with the same periods in 1912, are as follows:

## Imports of Iron and Steel

	December		Twelve months	
	1913 Gross tons	1912 Gross tons	1913 Gross tons	1912 Gross tons
Pig iron (including ferro- silicon) .....		12,062	*120,612	129,325
Ferrosilicon .....	276		1,900	
All other pig iron .....	12,173		134,923	
Scrap .....	1,312	2,712	44,153	23,612
Bar iron .....	1,328	2,606	28,243	26,112
Structural iron and steel .....	1,041	254	11,659	3,120
Ingots, blooms and steel billets .....		1,696	*17,765	18,702
Steel billets without alloys .....	542		12,173	
All other steel billets .....	2,229		16,700	
Steel rails .....	1,842	195	16,408	3,780
Sheets and plates .....	228	204	2,930	3,299
Tin and terne plates .....	4,741	171	20,680	2,053
Wire rods .....	940	1,331	16,098	15,069
Totals .....	26,452	21,231	317,244	225,072

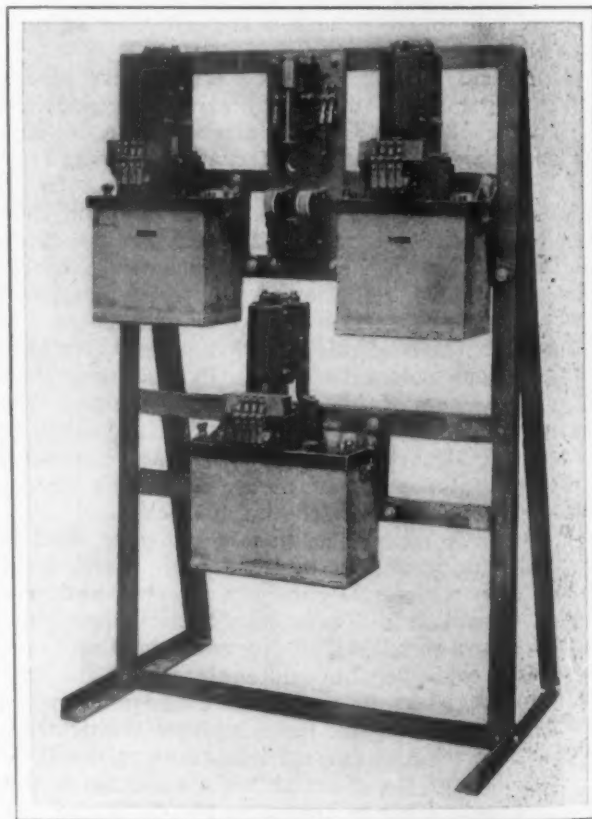
\*Figures cover period from January 1 to October 3, inclusive.

†Figures cover period since October 3, 1913.

Imports of iron ore in December were 223,933 tons, as compared with 179,727 tons in November, 274,433 tons in October, and 295,424 tons in September.

## Automatic High Voltage Motor Starter

To enable the 1100 and 2200 volt alternating-current squirrel-cage motors that are frequently used in large industrial plants and for driving centrifugal pumps and similar machines to be started easily, the Cutler-Hammer Mfg. Company,



A Recently Developed Automatic Starting and Speed Controlling Apparatus for 1100 and 2200 Volt Three-Phase Motors



Milwaukee, Wis., has brought out a new line of high-tension self-starters. The apparatus consists of a self-supporting frame, made of angle iron, upon which are mounted the high-tension oil immersed solenoid switches and the relays required to control the motor and auto-transformer circuits.

The starting switches are operated by single-phase solenoids and all the contacts are submerged in oil so that no parts carrying high voltages are exposed. The solenoids are operated by low-tension current. When they are used for controlling motors installed in connection with an open tank system, a float switch automatically regulates the operation of the starting apparatus, while on a closed or compression tank system a gauge or pressure regulator of the diaphragm type is employed. If desired, a remote control system can be used so that the operator can push a button at one or more points which are removed some little distance from the motor to stop and start it. The apparatus is made in standard sizes, ranging from 20 to 300 hp. for use on either 25 or 60 cycle three-phase circuits.

## BOOK REVIEWS

**Poor's Manual of Railroads—1914.** Forty-seventh annual number. Pages, 2052,  $5\frac{3}{4} \times 8\frac{3}{4}$  in. Published by Poor's Railroad Manual Company, 535 Pearl street, New York. Price, \$10.

Coming from the press one month earlier in the year than any previous edition, the present volume of this staple railroad manual contains a number of valuable new features. First of these is the information given showing whether or not interest on railroad bonds is payable without deduction for the United States income tax. This is the first publication giving such data in practically complete form. About 500 new comparative tables and new analytical tables appear in the 1914 volume. Later in the year will come the Manual of Public Utilities and the Manual of Industrials, issued by the same company. The three together cover the whole field of corporate investment of the United States.

**Handbook for Machine Designers and Draftsmen.** By Frederick A. Halsey. Pages  $x + 494$ ,  $9 \times 12\frac{1}{2}$  in.; some 120 charts and diagrams, 400 other illustrations and 400 tables. Published by McGraw-Hill Book Company, New York. Price, \$5.00.

For Mr. Halsey's book, *The Iron Age* has nothing but commendation. It is a monumental collection of data and facts needed in designing machinery and machine parts, and it is of such great scope and withal so free from the padding common in modern technical literature that it is difficult to give in a few words a proper idea of its contents. While a few words here will help, they can hardly surpass in adequate explanation an eight-page circular issued by the publisher and obtainable for the asking. In short, this circular tells how Mr. Halsey came to prepare the book, how it took on its unusual shape and yet retains the name handbook, and gives much of the information which should really be in the possession of the owner of the book of this sort, so that he has the opportunity to discount the author to such an extent as may seem to be necessary.

One of the features of the book is the generous use of drawings in the design of details, such as those of bearings, brakes for determining power requirements, methods of packing hydraulic joints.

Another is that not only has the author drawn on the numerous valuable contributions appearing in the technical press, but he has obtained the data of specialists, who have recognized the aim of the book to the extent of giving from the store of experimental information in the possession of their employing companies. A point worth mentioning also is that the book has been bound so that it will lie flat on one's table or drawing board, and the charts are large, so that they may be used directly from the book.

Of the subjects taken up at length, mention may be made of two chapters devoted to plain, ball and roller bearings, one chapter on shafts and keys and another on belts and pulleys; a chapter on flywheels and one on cone pulleys and back gears, and no less than six chapters on gears, covering spur, bevel, friction, worm, helical and planetary gears. Perhaps a good idea may be given of the book when it is stated that the chapter devoted to plain bearings contains in its 22 pages 17 tables and 32 cuts, two of which are full page charts; the subject is analyzed under such headings as permissible pressure; relation of speed and pressure; conditions of film lubrication; the practice of the Westinghouse and General Electric companies; water cooling of bearings; thrust bearings, and the like. Separate chapters are presented on ropes, chains, brakes, friction clutches and cams. In 11 pages devoted to springs there are five full-page charts, such that one may obtain directly from the chart, for example, the thickness of wire and the diameter of the coil of the helical spring for carrying a definite load.

Another interesting division of the book covers hydraulics and hydraulic machinery, including not only the flow of water in pipes, but hydraulic press cylinders and rams and hydraulic valves and fittings. Chapters are presented on bolts, nuts and screws, on wire sheet metal cases, on pipe and pipe joints and on minor machine parts, such as taper pins, T slots, shaft couplings, pawls, wrenches, punches and dies, etc. A similarly detailed consideration is given of press and running fits, the balancing of machine parts, the miscellaneous mechanisms considered in machine designs, such as the Geneva stop, and the power requirements of various tools, this covering not alone the sizes of motors for different machines, but the cutting capacity of tool steels.

About 50 pages of the book are given over to materials, including composition of cast iron, steel and various alloys. The presentation of this information is very attractive and convenient, and it includes the carbon requirements of steel for a list of about 300 cutting tools, from steel for trowels and spades to steel for wood axes and brick chisels and steel for saws.

Fifty pages are devoted to steam boilers, including rules for the strength of joints, for example, and to the steam engine, the gas engine and air compressors. The remainder of the book, close to 100 pages, is devoted to the general questions of mechanics, tables of weights and measures, and numerous tables usually to be found in a book of this sort.

**Transactions of the American Society of Mechanical Engineers.**—Volume 34 of the Transactions of the American Society of Mechanical Engineers, mainly devoted to the two general meetings of the society of 1912, is a volume of no less than 1467 pages,  $6 \times 9$  in. in size. Over 1400 pages are given over to the papers read at the Cleveland and New York meetings of that year. The volume is sold in half leather binding to non-members for \$11, and in paper for \$10.50.

ESTABLISHED 1855

# THE IRON AGE

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## The Iron Age's Quotations

Those who have followed the reports of the testimony given at the hearings in the suit for the dissolution of the United States Steel Corporation have doubtless observed that the attorneys for the corporation have at various times attacked the reliability of the quotations on iron and steel given in the trade press, and particularly those given in *The Iron Age*. The reason for this attack on trade paper quotations appears to have been the submission by the attorneys for the United States of a number of diagrams printed by *The Iron Age* showing curves of prices on steel products, covering a long series of years. These diagrams were included in evidence collected by the Government attorneys in the effort to show that at various times prices had changed so little in periods of considerable length as to indicate concert of action or agreement as to prices among the manufacturers of such products.

These diagrams and accompanying tables of prices were not prepared by *The Iron Age* for the purpose of assisting the Government attorneys in developing their case against the United States Steel Corporation. They have been for many years an incident of the publication of *The Iron Age*, and their periodical presentation has been accepted by the trade as an important contribution to the study of fluctuations in the value of iron and steel products. They have been prepared conscientiously from the time when the first diagram was brought out. They have always been based on the quotations given in the weekly market reports of the paper. These market reports are accepted by the trade as presenting the actual prices prevailing at the time of their first appearance in print and their accuracy has never been assailed until this suit.

We have observed the course of the corporation attorneys with regard to the reliability of our prices with considerable impatience. Possibly our readers have wondered that we have remained silent under these attacks. Up to the present time it seemed that the reputation of *The Iron Age* and its high appreciation among those who have read it for years made it unnecessary to take notice of these attacks and insinuations. Last Wednesday, however, a prominent political economist, Professor J. W. Jenks, of the University of New York, was placed on the witness stand by the attorneys for the corporation and he was used in a more determined effort to discredit the figures of *The Iron Age*. The professor gave results of his profound study of

statistics of prices in an examination which ran over several hours. Replying to a question regarding the prices shown in one of the diagrams of *The Iron Age*, he said: "The quotations in *The Iron Age* or in the reports of the American Iron and Steel Association do not represent actual buying and selling prices, but simply the general trend of prices in these commodities at that time and more frequently, perhaps, the general asking price by some of the leading sellers."

In thus discrediting the quotations in *The Iron Age*, this eminent economist casts discredit on his own inferences in another part of his testimony where he shows that the buying power of iron and steel in respect to other commodities has diminished by a certain percentage since the formation of the United States Steel Corporation. As the price tables of *The Iron Age* have probably been used by him in making this comparison, it is remarkable indeed that he should have calculated a precise rate of percentage. We do not know what tables of prices of other commodities he has taken for the purpose of making his comparisons. If these tables of commodities have been taken from statistics given in daily newspapers or even economical publications, we challenge their accuracy. We are sure that the professor could not himself have compiled such prices from any source likely to be authoritative. We know how the prices given in *The Iron Age* are collected and we know that we can claim accuracy for them. The prices of other commodities than iron and steel which are available for economists are not by any means secured by trained market reporters, but are such as appear in the columns of daily newspapers or in sheets which make no pretense of securing close prices. Further, they are usually given in such form that the unit or basis is not directly comparable with the basis of iron and steel prices.

The professor further commits an egregious error when he says that the quotations in *The Iron Age* represent simply "the general trend of prices," as when these quotations are given they are the actual prices at which a product is selling. They are intended to guide the buyer and the seller and are so accepted by the trade. If he had said that the values shown on the diagrams do not represent actual prices, he would have been correct, as the diagrams are made from averages for a month from the weekly prices, and therefore the values are an approximation to the prices.

We would like Professor Jenks to give us his



authority for the statement he made in his testimony that our quotations "do not represent actual buying and selling prices." He could not have said so from personal knowledge, as he is not engaged in the business of buying and selling iron and steel and is therefore not a competent witness on this point. We further challenge the professor to produce statistics of prices of other commodities than iron and steel which are at all comparable in point of accuracy with the quotations on iron and steel products given in our columns.

### Salesmanship in Steel

Some of the questions of the attorneys in the Steel Corporation suit, like some of those asked in the Stanley Committee hearings at Washington two years ago, show a confusion of ideas on the selling of steel. We recall that a certain Congressman in questioning an independent steel manufacturer touched on the danger of allowing the latter's quotations on his products to become known to his larger competitors. The Congressman somehow had the notion that if a large consolidation like the Steel Corporation were allowed to get hold of the prices the smaller manufacturer was quoting it would at once go about quoting lower, and thus eventually would take all his trade away from him. The questioner's knowledge of practice in the business under discussion was about equal to that of another Congressman who in a tariff hearing a few years ago expressed surprise that a manufacturer-witness should think of asking for a duty on wood screws when he knew it had been decided to put lumber on the free list!

Quite in contrast with the jumble of ideas often developed at judicial and Congressional hearings on business was the clear-cut statement of Severn P. Ker, president of the Sharon Steel Hoop Company, who testified a few days ago in the Steel Corporation suit. Mr. Ker showed how readily a man who knows can cut through a whole bundle of theories of the man in the street. He had good reasons for believing, and he stated them convincingly, that the Steel Corporation could not, if it tried, put his company out of business. He brought out strongly the personal factor in selling, the ability to make and hold business friends and to get a preference in the placing of an order when terms are equal, and occasionally when the offer of the competitor may show a slight advantage. This personal factor seems to be quite past the ken of those who insist that a large corporation means inevitably the extermination of smaller corporations in the same line.

Much time was spent in the Stanley investigation in trying to bring out the method of establishing prices in iron and steel. In the Steel Corporation suit also the attorneys for the Government went into a devious line of questioning in the effort to show that the market is established by "announcing" prices, and that for a time the Steel Corporation did the announcing, while other producers accepted the announced price as their own. In combating this view, the defense has rather overdone the business of proving variations from quotations in market reports, for it is well known that at certain periods in the past dozen years the variations from a generally quoted price have been rare and of

small consequence. But the situation Mr. Ker described is that in which the selling company is unhampered by any agreement or understanding and sends its salesmen out to get as large a share as possible of the going business. What he says as to the high character of the equipment required of the successful salesman under such circumstances is borne out by the inside history of many a steel contract that could be cited. The skillful approach, the diplomatic uncovering of the real situation as to the terms competitors have offered, the finesse involved in making just enough of a concession, and not too much, to get the business—all enter into a finished performance of the familiar drama of "The Capture of an Order."

We are not sure that we agree with Mr. Ker's tribute to the salesmanship that gets a little better price than that of a competitor. The steel trade is so largely in products in which the factor of superior quality is not involved, specifications setting a standard to which all competitors must conform, that the paying of a price above the competitive basis should ordinarily be called poor buying, likely sooner or later to mean a dissatisfied customer.

It is an open question to what extent the equipment for successful salesmanship in steel products has been affected by the "era of good feeling" that has prevailed in more recent years. In the days of pools the salesman was put to it to offer any tangible inducement. There was one price, and detected variations carried penalties. Hence came the evasions, the roundabout concessions, such as buying the customer's scrap at high prices, or selling at very low prices other products along with those controlled by the agreement. The later régime of the gentlemen's agreement was beset with similar difficulties, from which the open market that has existed since May, 1911, brought release. The present period, while free from the hamperings of understandings, is yet a far cry from any-price-to-get-the-order, which marked the dark days of the middle nineties. There is no mistaking the results of the friendships among the heads of important steel companies, friendships formed or strengthened by the iron and steel trade meetings of the past six or seven years. There have been at times incursions by one company upon the trade of another, but in times of 50 per cent. to 80 per cent. operation of plants the extent to which the live-and-let-live policy has prevailed would have been deemed impossible in the old days. Salesmen have had to depend for holding and increasing their trade on something besides the brute argument of a deep cut in the price. There have been evidences, indeed, of a wholesome appreciation of the danger that would come to the whole situation should any important producer try to get business for a 100 per cent. operation when consumption was only 60 or 70 per cent. of capacity. Never was the prevalence of this spirit of conservation more marked than in the closing weeks of 1913 and the opening weeks of the present year. Emphasis may be put on this or that feature in diagnosing the remarkable experience through which the trade has passed since October; but there is no mistaking the fact that steel manufacturers have learned a lesson in salesmanship that should work greatly to their profit in trying times they may yet have to meet.

## Caring for the Unskilled Laborer

The problem of maintaining a force of skilled workmen is realized by every employer, but the unskilled man is often overlooked. When business is really good he becomes a factor by no means to be neglected. In fact, at all times the "lumper" is an individual who should be carefully considered, because not only is his brute strength an indispensable adjunct to every manufacturing plant, but many of his type develop into first rate men. The works environment of such men, their own observation and the suggestions of superintendent or foreman often lead to their gradual advancement until they become much prized employees.

Much attention has been given to the welfare of high priced workmen while they are outside of the shop. In some remote communities, even in large centers, boarding houses and clubs are maintained for them, and the effort is made to provide suitable homes for those who have families. But the unskilled employee of shop or foundry gets little attention. Usually he is a foreigner, unfamiliar with the English language and American customs. He is clannish and prefers the society of people of his own race. Often he lives with his countrymen more or less on a co-operative basis. Usually such places are indescribably unwholesome from the American viewpoint.

A large machinery builder in a small town has tried the experiment of establishing a boarding house for its workmen of one particular race—the Poles. About 30 are employed, and many of them are considered very good men. The company erected a building in which they live in great comfort—in luxury, in fact, as compared with what many of them had known. There are two stories and a basement, which is practically a story in itself. The men have a kitchen and the necessary store-rooms in the basement and sleep in the upper stories, which are divided into a sufficient number of rooms to give a degree of privacy. The furniture is plain but good enough. The company supervises the premises, so that hygienically a sufficiently high standard is maintained. The plan has worked well and could be adopted by many manufacturers to the advantage of their employees and themselves.

## Libraries in Industrial Works

The public library sub-station for the distribution of books in manufacturing plants has made a beginning and is doing an important educational work. While thus far it exists in but a few centers, it has passed the experimental stage and proved its worth. For the most part the branches have been located in rooms outside of the actual manufacturing departments, usually in connection with the office, and the workmen have to go a little out of their way to avail themselves of these opportunities. The books in most of the branches consist of a general selection in English.

A wire mill located in one of the largest cities of the Middle West has developed the idea on much broader lines. In the first place, the branch is located directly within the mill, in a room where many men are employed; further, the books are not confined to English, but include volumes of the more popular sort in various languages. Many nationalities are represented in most modern factories.

Every public library in the larger cities contains books written in the languages of Europe, including French, German, Italian, Spanish, Scandinavian and occasionally Russian. But the newer races represented in our population speak tongues other than those enumerated. For example, the Russians are made up not only of the pure Russian type, but of what may be called submerged nationalities, each with a language of its own, which in turn is broken up into various dialects. In some cases these smaller constituents have a literature of their own and certain standard English works have been translated into these various tongues.

In establishing a branch under this system the city library puts no expense upon the manufacturer. He must furnish racks for the books and usually his employees can supply these at a very small cost. He must provide the clerks who see to the routine of distribution and collection, and he is held responsible for loss of volumes. The clerical work requires the service of one or two persons for a fraction of a day only. The central library will furnish any book for which application is made at the branch.

In the wire mill library branch referred to the book racks stand close by the wire blocks and other equipment. They are always in sight of the men working near them, and many other employees pass them several times each day. They arouse the curiosity of the ignorant and the interest of the more intelligent. The men are permitted to handle them, following the most approved library practice. Hands may be none too clean and the pages may be soiled, but that is a part of the system, a sacrifice that is considered worth while if it assists in adding a new reader of books, for every such reader is presumed to become more valuable as an employee. The foreigner, in glancing over the racks, may catch a word or a character in his own language, and he has learned that he may borrow the book without charge. He reads the stories by his own countrymen, also stories descriptive of American life and customs which have been translated into his language.

The non-English-speaking workman is in a great many cases afraid of the public library. The attendant is ready to serve him, but does not know his language. A catalogue means little to him. He goes away convinced that the library is no place for him. In his own shop he is at home and he lives with the books which he may take away at any time. At the branch in question one of the men who has charge of distributing the books is an interpreter, so that he can give intelligent assistance to every one. Experience has proved that the branch library of this type has a stimulating influence also on English speaking employees. The engineers and mechanics of the establishment seize the chance to procure works which will assist them in the duties of their positions and help them to advance. A little consideration of this new institution should lead many employers to establish one at their plants.

The Whitney-Kemmerer Company, which now has offices in New York, Philadelphia, Boston, Pittsburgh, Buffalo, and in Altoona and Mauch Chunk, Pa., has established an office in the First National Bank Building, Norton, Va., for the purpose of buying and selling pig iron, coke and coal. This office will place the company in closer touch with the trade which it already enjoys in the South. It has for the past 40 years ranked among the largest producers and shippers of both bituminous and anthracite coal and has recently been appointed exclusive sales agent for the Wise Coal & Coke Company, Sutherland Coal & Coke Company and Colonial Coal & Coke Company.



## Correspondence

### Getting Out Errorless Catalogues

*To the Editor:* Errorless catalogues that contain much data are a rarity, and if you have ever had anything to do with data compiling you will sympathize with the man who must bear the brunt of the blame for errors. Usually the perfection of a catalogue is the result of many previously corrected editions and considerable catalogue experience on the part of the compiler.

I have helped to compile several catalogues, but can remember no large one on which I was told to take my time, to recheck all figures carefully, and be sure that everything was O. K. before allowing the final proofs to go to the printer for publishing. Invariably, where errors were discovered in the completed edition, I, of course, was blamed. Hasty throwing together of any kind of literature usually foretells an unsatisfactory product.

I recently helped on a catalogue of considerable tabular matter, all of which had been massed roughly by several employees of the company. I had nothing to do with the compiling or arranging and was pretty sure I could find errors in the final proof should I look for them carefully enough. When the proofs were handed to me I was casually told to "look for misspelled words and grammatical errors." I discovered a few such errors and could have permitted the catalogue to go at that, but was curious to know whether or not I could discover any other more serious errors. In my first attempt to follow cross-references I found that one table referred to was not in the catalogue at all. I grew interested. I found more such errors. And after I had found enough to make it interesting for the manager, I went into his office and apprised him of the facts.

The best way to get up matter of this kind is to have a large number of first proofs printed. Eight or ten should be enough for the average manufacturer. Then distribute these proofs not only to the president, chief engineer and others of the higher-up officials, but also to some of the district offices, salesmen, bookkeepers, and others who will have to use the catalogue considerably in the future. These latter men are the ones who will find the little errors if anyone can. Instruct every man to whom a proof is sent to check it to the best of his ability and to offer suggestions for the betterment of the descriptive matter if he thinks that betterment is possible. Criticism of this kind is a good thing, and by the time the criticisms on the several proofs sent out are combined on one proof sheet, you can feel pretty safe in letting the catalogue go through. I am now working on a catalogue that is being put through on this principle and so far it is working out in good shape. We expect to put out an errorless catalogue.

N. G. NEAR.

NEW YORK CITY.

### Testing Society Meeting

The seventeenth annual meeting of the American Society for Testing Materials will be held at Atlantic City, N. J., June 30 to July 4, 1914, with headquarters at Hotel Traymore. As was done last year, in view of the improved financial condition of the society, papers and committee reports will be printed and circulated in advance of the meeting. Technical committees whose reports will contain recommendations affecting specifications are asked to have these in the hands of the secretary as far as possible in advance of the eight weeks' period prescribed for papers. The present membership of the society is 1649, as compared with 1574 at the annual meeting of 1913.

Iron ore of high grade is reported to have been found in large quantities at Banjeli in German West Africa. The report also states that the Krupps are negotiating with the German government to obtain a concession to work the deposits.

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### First Brier Hill Sheet Bars Made

On Wednesday, February 11, the first sheet bars were rolled in the new open-hearth steel plant of the Brier Hill Steel Company, Youngstown, Ohio. They were shipped to the Thomas works of the company at Niles, Ohio, and were rolled into sheets the following Friday. H. C. Davis, superintendent of the Thomas works, reports that the bars worked nicely, and the sheets rolled from them were perfect in every way. The Brier Hill Steel Company will now be a regular producer of billets and sheet bars, and has already sold a considerable tonnage of these products to mills in the Youngstown district. It is expected that this week six of the seven open-hearth furnaces in its new plant will be in operation. The blooming mill had been running for some time, but the sheet bar-mill was not started until last week.

J. M. Manley, secretary, Cincinnati Branch, National Metal Trades Association, Cincinnati, Ohio, announces that the annual meeting of that organization will be held on the evening of March 5, at the Business Men's Club. A dinner will be served at 6.30 o'clock. Among the outside speakers will be Nelson W. Dingwall, president of the Chicago branch, and F. C. Caldwell, treasurer of the national organization.

# The Iron and Metal Markets

## SOME INCREASE AT MILLS

### Corporation Up to 80 Per Cent. in Steel

#### Large Structural Jobs—Foreign Rail Demand Good—Reaction in Scrap

Rolling mill operations are gradually increasing, and it is the general report that consumers are specifying on their contracts at an unusually full rate, indicating that replenishment is continuous and that some of it is urgent. New orders with some important companies are larger than was expected of February, in view of the good January bookings and the lack of price inducements for forward buying.

Steel companies most dependent on railroad demand naturally find less reason than others for favorable forecasts. The Steel Corporation, with its wide diversity of products and its foreign trade, reports new bookings 10,000 tons a day more in the first two weeks of February than in the corresponding days of January. It is operating this week at 80 per cent. of ingot capacity and after drawing on its pig-iron stocks to the extent of 150,000 tons since January 1, is starting four additional blast furnaces this week—one each at the Lorain, McKeesport, Edgar Thomson and South Chicago groups.

Several independent steel companies are also running fuller than at the opening of the month, due largely to the demand for shipments in wire, sheets, tin plates and tubular products.

With all their efforts to keep from buying, the railroads are more than a negligible factor. The Central of Georgia has bought 7500 tons of rails from the Ensley mill and the Illinois Central, 10,000 tons. At Chicago, 14,000 tons was placed, including 6300 tons for the Omaha. The Northern Pacific is in the market. The Pennsylvania order, when it comes, will probably include some 120-lb. sections and there are some unusual requirements as to low rolling temperatures.

In the Chicago district contracts for 50,000 tons of car material have just been closed, partly for unreported car orders. The Cambria Steel Company will build 500 hopper cars for the Cambria & Indiana. Early orders are expected from some of the Steel Corporation's roads.

Prices on bars, plates and shapes still show irregularity, but in the Chicago district where plates and shapes have shown special weakness, there is more firmness on the latter. Bars are commonly 1.20c., Pittsburgh. The effort to establish 1.25c. for plates and shapes goes on, with varying success.

In several directions projects calling for large tonnages are getting closer to the mills. From 40,000 to 45,000 tons of plates have been bought for the Gatineau lakes pipe line in Canada. Deliveries cover 18 months and the reported price is 1.20c., Pittsburgh. For the Memphis bridge and approaches, on which bids go in this week, 16,000 tons will be wanted soon, and all told about 30,000 tons. For the third tracking of the Manhattan Elevated 50,000 tons is about to come up for bids. In New York City 3000 tons of sheet piling for the new Forty-sixth street pier was awarded the Lackawanna Steel Company.

Steel imports due to the lower tariff are so small that what is done gets exaggerated notice.

At San Francisco the delivered price on 1200 tons of bars recently brought in figures out less than 1c., Pittsburgh. Our German letter tells of the first buying of hoops and bands in that market for shipment to the United States. Canadian wire products have invaded Maine in a straggling way.

Fresh buying of pig iron is not important. In eastern Pennsylvania about 25,000 tons of basic iron was closed at \$14 to \$14.25 delivered, chiefly the latter. A Southern seller took a total of 20,000 tons in the Chicago district at \$10.50 to \$10.75, Birmingham, for No. 2 and some warrant iron is still offered at concessions in the Central West.

In the scrap trade the expected reaction has set in. At Chicago some hurried efforts to realize have brought prices down 50 cents.

The international rail trade is promising. For Australia and South Africa large inquiries are out and the Nova Scotia mill has taken 15,000 tons for New South Wales. An order for the Pekin & Kalgan Railway may come to the United States. The Pachuca Railroad in Mexico is figuring on a large order. Roumania and Greece will build new lines. Unusually heavy rail and equipment orders will be given German mills by the Prussian State railroads from late financing.

## A Comparison of Prices

### Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous.

	Feb. 18,	Feb. 11,	Jan. 21,	Feb. 19,
<b>Pig Iron, Per Gross Ton:</b>	1914.	1914.	1914.	1913.
No. 2 X, Philadelphia...	\$15.00	\$15.00	\$14.50	\$18.25
No. 2, Valley furnace...	13.25	13.25	12.75	17.00
No. 2 Southern, Cin'ti...	13.75	13.75	13.75	16.75
No. 2, Birmingham, Ala.	10.50	10.50	10.50	13.50
No. 2, turnace, Chicago*	14.00	13.75	13.50	17.25
Basic, del'd, eastern Pa.	14.25	14.00	14.00	18.00
Basic, Valley furnace...	13.25	13.25	12.50	16.25
Bessemer, Pittsburgh...	15.15	15.15	14.90	18.15
Malleable Bess., Ch'go*	14.00	13.75	13.50	17.25
Gray forge, Pittsburgh...	13.65	13.65	13.40	17.15
L. S. charcoal, Chicago...	15.25	15.25	15.25	18.00
<b>Billets, etc., Per Gross Ton:</b>				
Bess. billets, Pittsburgh...	21.00	21.00	20.00	28.50
O.-h. billets, Pittsburgh...	21.00	21.00	20.00	29.00
O.-h. sheet bars, P'gh...	22.00	22.00	20.00	29.50
Forging billets, P'gh...	25.00	25.00	24.00	36.00
O.-h. billets, Phila...	23.40	22.40	21.50	32.00
Wire rods, Pittsburgh...	26.50	26.50	25.50	30.00

<b>Old Material, Per Gross Ton:</b>				
Iron rails, Chicago...	13.25	13.00	13.00	16.25
Iron rails, Philadelphia...	16.50	16.50	15.50	18.00
Carwheels, Chicago...	12.50	12.75	11.75	16.75
Carwheels, Philadelphia...	12.75	12.50	12.50	15.00
Heavy steel scrap, P'gh...	12.75	12.75	11.00	14.00
Heavy steel scrap, Phila...	11.00	11.00	11.00	12.50
Heavy steel scrap, Ch'go...	10.50	11.00	9.50	12.25
No. 1 cast, Pittsburgh...	12.00	12.00	10.75	15.00
No. 1 cast, Philadelphia...	13.00	13.00	12.00	14.50
No. 1 cast, Ch'go (net ton)	10.75	11.25	10.25	12.50

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

<b>Finished Iron and Steel,</b>				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.27 1/2	1.25	1.20	1.67 1/2
Iron bars, Pittsburgh...	1.40	1.40	1.35	1.70
Iron bars, Chicago...	1.12 1/2	1.12 1/2	1.10	1.60
Steel bars, Pittsburgh...	1.20	1.20	1.20	1.70
Steel bars, New York...	1.36	1.36	1.36	1.86
Tank plates, Pittsburgh...	1.20	1.20	1.20	1.70
Tank plates, New York...	1.36	1.36	1.36	1.86
Beams, etc., Pittsburgh...	1.20	1.20	1.20	1.70
Beams, etc., New York...	1.36	1.36	1.36	1.86
Skelp, grooved steel, P'gh	1.25	1.25	1.26	1.45
Skelp, sheared steel, P'gh	1.35	1.35	1.30	1.50
Steel hoops, Pittsburgh...	1.30	1.30	1.35	1.60

<b>Sheets, Nails and Wire,</b>				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.95	1.95	1.85	2.35
Galv. sheets, No. 28, P'gh	2.95	2.95	2.85	3.50
Wire nails, Pittsburgh...	1.60	1.60	1.55	1.75
Cut nails, f.o.b. East'n mills	1.65	1.65	1.65	1.80
Cut nails, Pittsburgh...	1.60	1.60	1.55	1.70
Fence wire, base, P'gh...	1.40	1.40	1.35	1.55
Barb wire, galv., P'gh...	2.00	2.00	1.95	2.15



## Coke, Connellsville,

	Feb. 18, 1914.	Feb. 11, 1914.	Jan. 21, 1914.	Feb. 19, 1913.
Per Net Ton at Oven:				
Purchase coke, prompt....	\$1.85	\$1.85	\$1.85	\$2.25
Purchase coke, future....	2.00	2.00	2.00	2.50
Purchase coke, prompt....	2.50	2.50	2.50	3.00
Purchase coke, future....	2.75	2.75	2.60	3.00

## Metals.

	Cents.	Cents.	Cents.	Cents.
Per lb. to Large Buyers:				
Lake copper, New York....	15.00	15.00	14.75	15.00
Electrolytic copper, N. Y.	14.62½	14.70	14.37	14.87½
Spelter, St. Louis.....	5.25	5.30	5.10	6.20
Spelter, New York.....	5.40	5.45	5.25	6.35
Lead, St. Louis.....	3.87½	4.05	3.97	4.20
Lead, New York.....	4.00	4.15	4.10	4.35
Tin, New York.....	39.25	41.00	37.85	49.25
Antimony, Hallett's, N. Y.	7.00	7.00	7.00	8.75
Tin plate, 100-lb. box, P'gh.	\$3.30	\$3.30	\$3.25	\$3.60

## Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb., New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.20c. to 1.25c. base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

	Cents per lb.
Extras	
Gauges under ¼ in. to and including 3-16 in....	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over.....	.10
Complete circles 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zeels, 3 in. and over, 1.20c. to 1.25c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.....	.10
H-beams over 18 in.....	.10
Angles over 6 in. on one or both legs.....	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick as per steel bar card, Sept. 1, 1909.....	.70
Tees, structural sizes (except elevator, hand rail, car truck and conductor rail).....	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.....	.20 to .80
Deck beams and bulb angles.....	.30
Hand rail tees.....	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55
No charge for cutting to lengths 3 ft. and over.	

Wire Rods.—Bessemer, open-hearth and chain rods, \$23.50 to \$27.

Wire Products.—Fence wire, Nos. 0 to 9 per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers annealed, \$1.40; galvanized, \$1.80. Galvanized barb wire and fence staples, to jobbers, \$2; painted, \$1.60. Wire nails to jobbers, \$1.60. Prices of the foregoing wire products to dealers, in carload lots, are 5c. higher. Woven wire fencing, 74 per cent. off list for carloads; 73 off for 1000-rod lots; 72 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

	Plain Wire, per 100 lb.									
Nos.	0 to 9	10	11	12	12½	13	14	15	16	
Annealed	\$1.60	\$1.65	\$1.70	\$1.75	\$1.85	\$1.95	\$2.05	\$2.15	\$2.25	
Galvanized	2.05	2.05	2.10	2.15	2.25	2.35	2.75	2.85		

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from February 2, 1914, and iron pipe from June 2, 1913, all full weight:

Steel.			Iron.		
Inches.	Black.	Galv.	Inches.	Black.	Galv.
1, 1½ and 2.....	72½	52	1½ and 2.....	66	47
2½ to 3.....	76½	66	2½ to 3.....	65	46
3 to 4.....	79½	71	3 to 4.....	69	56
4 to 5.....	82½	76	4 to 5.....	72	61
5 to 6.....	85½	81	5 to 6.....	75	66
6 to 7.....	88½	86	6 to 7.....	78	71
7 to 8.....	91½	91	7 to 8.....	81	76
8 to 9.....	94½	96	8 to 9.....	84	81
9 to 10.....	97½	101	9 to 10.....	87	86
10 to 11.....	100½	106	10 to 11.....	90	91
11 to 12.....	103½	111	11 to 12.....	93	96
12 to 13.....	106½	116	12 to 13.....	96	101
13 to 14.....	109½	121	13 to 14.....	99	106
14 to 15.....	112½	126	14 to 15.....	102	111
15 to 16.....	115½	131	15 to 16.....	105	116
16 to 17.....	118½	136	16 to 17.....	108	121
17 to 18.....	121½	141	17 to 18.....	111	126
18 to 19.....	124½	146	18 to 19.....	114	131
19 to 20.....	127½	151	19 to 20.....	117	136
20 to 21.....	130½	156	20 to 21.....	120	141
21 to 22.....	133½	161	21 to 22.....	123	146
22 to 23.....	136½	166	22 to 23.....	126	151
23 to 24.....	139½	171	23 to 24.....	129	156
24 to 25.....	142½	176	24 to 25.....	132	161
25 to 26.....	145½	181	25 to 26.....	135	166
26 to 27.....	148½	186	26 to 27.....	138	171
27 to 28.....	151½	191	27 to 28.....	141	176
28 to 29.....	154½	196	28 to 29.....	144	181
29 to 30.....	157½	201	29 to 30.....	147	186
30 to 31.....	160½	206	30 to 31.....	150	191
31 to 32.....	163½	211	31 to 32.....	153	196
32 to 33.....	166½	216	32 to 33.....	156	201
33 to 34.....	169½	221	33 to 34.....	159	206
34 to 35.....	172½	226	34 to 35.....	162	211
35 to 36.....	175½	231	35 to 36.....	165	216
36 to 37.....	178½	236	36 to 37.....	168	221
37 to 38.....	181½	241	37 to 38.....	171	226
38 to 39.....	184½	246	38 to 39.....	174	231
39 to 40.....	187½	251	39 to 40.....	177	236
40 to 41.....	190½	256	40 to 41.....	180	241
41 to 42.....	193½	261	41 to 42.....	183	246
42 to 43.....	196½	266	42 to 43.....	186	251
43 to 44.....	199½	271	43 to 44.....	189	256
44 to 45.....	202½	276	44 to 45.....	192	261
45 to 46.....	205½	281	45 to 46.....	195	266
46 to 47.....	208½	286	46 to 47.....	198	271
47 to 48.....	211½	291	47 to 48.....	201	276
48 to 49.....	214½	296	48 to 49.....	204	281
49 to 50.....	217½	301	49 to 50.....	207	286
50 to 51.....	220½	306	50 to 51.....	210	291
51 to 52.....	223½	311	51 to 52.....	213	296
52 to 53.....	226½	316	52 to 53.....	216	301
53 to 54.....	229½	321	53 to 54.....	219	306
54 to 55.....	232½	326	54 to 55.....	222	311
55 to 56.....	235½	331	55 to 56.....	225	316
56 to 57.....	238½	336	56 to 57.....	228	321
57 to 58.....	241½	341	57 to 58.....	231	326
58 to 59.....	244½	346	58 to 59.....	234	331
59 to 60.....	247½	351	59 to 60.....	237	336
60 to 61.....	250½	356	60 to 61.....	240	341
61 to 62.....	253½	361	61 to 62.....	243	346
62 to 63.....	256½	366	62 to 63.....	246	351
63 to 64.....	259½	371	63 to 64.....	249	356
64 to 65.....	262½	376	64 to 65.....	252	361
65 to 66.....	265½	381	65 to 66.....	255	366
66 to 67.....	268½	386	66 to 67.....	258	371
67 to 68.....	271½	391	67 to 68.....	261	376
68 to 69.....	274½	396	68 to 69.....	264	381
69 to 70.....	277½	401	69 to 70.....	267	386
70 to 71.....	280½	406	70 to 71.....	270	391
71 to 72.....	283½	411	71 to 72.....	273	396
72 to 73.....	286½	416	72 to 73.....	276	401
73 to 74.....	289½	421	73 to 74.....	279	406
74 to 75.....	292½	426	74 to 75.....	282	411
75 to 76.....	295½	431	75 to 76.....	285	416
76 to 77.....	298½	436	76 to 77.....	288	421
77 to 78.....	301½	441	77 to 78.....	291	426
78 to 79.....	304½	446	78 to 79.....	294	431
79 to 80.....	307½	451	79 to 80.....	297	436
80 to 81.....	310½	456	80 to 81.....	300	441
81 to 82.....	313½	461	81 to 82.....	303	446
82 to 83.....	316½	466	82 to 83.....	306	451
83 to 84.....	319½	471	83 to 84.....	309	456
84 to 85.....	322½	476	84 to 85.....	312	461
85 to 86.....	325½	481	85 to 86.....	315	466
86 to 87.....	328½	486	86 to 87.....	318	471
87 to 88.....	331½	491	87 to 88.....	321	476
88 to 89.....	334½	496	88 to 89.....	324	481
89 to 90.....	337½	501	89 to 90.....	327	486
90 to 91.....	340½	506	90 to 91.....	330	491
91 to 92.....	343½	511	91 to 92.....	333	496
92 to 93.....	346½	516	92 to 93.....	336	501
93 to 94.....	349½	521	93 to 94.....	339	506
94 to 95.....	352½	526	94 to 95.....	342	511
95 to 96.....	355½	531	95 to 96.....	345	516
96 to 97.....	358½	536	96 to 97.....	348	521
97 to 98.....	361½	541	97 to 98.....	351	526
98 to 99.....	364½	546	98 to 99.....	354	531
99 to 100.....	367½	551	99 to 100.....	357	536

Reamed and Drifted

1 to 3, butt.....	77½	69	1 to 1½, butt.....	70	59
2, lap.....	74½	66	2, butt.....	70	59
2½ to 6, lap.....	76½	68	1½, lap.....	54	43
			1½, lap.....	65	54
			2, lap.....	66	56
			2½ to 4, lap.....	68	59

Butt Weld, extra strong, plain ends

1, 1½ and 2.....	67½	57	3½.....	63	52
2½ to 3.....	72½	66	4½.....	67	60
3 to 4.....	76½	70	5 to 6.....	71	62
4 to 5.....	77½	71	6 to 7.....	72	63

Lap Weld, extra strong, plain ends

2.....	73½	65	1½.....	65	59
2½ to 4.....	75½	67	2.....	66	58
4½ to 6.....	74½	66	2½ to 4.....	70	61
7 to 8.....	67½	57	4½ to 6.....	69	60
9 to 12.....	62½	52	7 and 8.....	63	53
			9 to 12.....	58	47

Butt Weld, double extra strong, plain ends

1, 1½ and 2.....	62½	56	1½.....	57	49
2½ to 3.....	65½	59	3½ to 4.....	60	52
3 to 4.....	67½	61	4 to 5.....	62	54

Lap Weld, double extra strong, plain ends

2.....	63½	57	2.....	55	49
2½ to 4.....	65½	59	2½ to 4.....	60	54
4½ to 6.....	64½	58	4½ to 6.....	59	53
7 to 8.....	57½	47	7 to 8.....	52	42

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from January 2, 1914, are as follows:

for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

## Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11.....	1.95 to 2.00
No. 12.....	2.05 to 2.10
Nos. 13 and 14.....	2.05 to 2.10
Nos. 15 and 16.....	2.20 to 2.25
Nos. 17 to 21.....	2.35 to 2.40
Nos. 22 and 24.....	2.50 to 2.55
Nos. 25 and 26.....	2.65 to 2.70
No. 27.....	2.80 to 2.85
No. 28.....	2.95 to 3.00
No. 29.....	3.10 to 3.15
No. 30.....	3.25 to 3.30

## Chicago

CHICAGO, ILL., February 18, 1914.—(By Wire.)

The iron and steel situation again suggests the fact that with the railroads buying normally a strong and advancing market might even now confront us, yet, without that railroad buying, activity sufficient to produce a sustained upward tendency in the market cannot long be supported. The past week, the tonnage sold continued to hold up to the rate of recent weeks but hardly more than that. The outlook is most promising with respect to shapes. The leading interest advanced its quotations \$1 a ton on plates. Bar iron occupies a better position, and bolts are subject to less liberal discounts. One of the features of last week was the right-about-face executed by dealers in old material, as the result of which a decline of 25c. to 50c. was registered. In pig iron there was a fair aggregate of small orders for Northern iron, and one Southern interest booked an aggregate of 20,000 tons.

**Pig Iron.**—Purchases of Northern iron which are now engaging attention are generally for small tonnages, and for this business the furnace position appears to be firmly established at a minimum of \$14, with \$14.25 a common quotation. The feature of the week's trading was the placing of 20,000 tons of Southern iron by one interest in lots ranging from 100 to 2000 tons. For this business prices equivalent to \$10.50, Birmingham, or \$10.75 at furnace, were made. Charcoal-iron business is being sought aggressively in this market by some of the furnaces and prices have shown no improvement. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4.....	\$15.25 to \$15.75
Northern coke foundry, No. 1.....	14.50 to 14.75
Northern coke foundry, No. 2.....	14.00 to 14.25
Northern coke foundry, No. 3.....	13.75 to 14.00
Southern coke No. 1 f'dry and 1 soft.....	15.35 to 15.85
Southern coke, No. 2 f'dry and 2 soft.....	14.85 to 15.35
Southern coke, No. 3.....	14.35 to 14.85
Southern coke, No. 4.....	13.85 to 14.35
Southern gray forge.....	13.60 to 14.10
Southern mottled.....	13.10 to 13.60
Malleable Bessemer.....	14.00 to 14.25
Standard Bessemer.....	16.50
Basic.....	13.50 to 14.00
Jackson Co. and Kentucky silvery, 6 per cent.....	16.90
Jackson Co. and Kentucky silvery, 8 per cent.....	17.90
Jackson Co. and Kentucky silvery, 10 per cent.....	18.90

(By Mail)

**Rails and Track Supplies.**—Western rail mills are running on pretty light schedules. Occasional small contracts and participation in awards such as the Lake Shore & Michigan Southern distribution of 60,000 tons the past week are still too few to make an impression on mill capacity. The week has seen some buying of spikes. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts with square nuts, 2.05c. to 2.10c., base, all in carload lots, Chicago; tie plates, \$27 to \$28 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

**Structural Material.**—Much of the strength of the situation is contributed by the accumulation of business in structural shapes. The leading interest has announced an advance in its minimum quotation to the basis of 1.25c., Pittsburgh, and it is doubtful if 1.20c. can be done on ordinary tonnage with any mill. The Mississippi River bridge at Memphis, for which 16,000 tons will be required in the near future and about as much more before completion, is one of the attractive prospects for fabricated steel. The contract for the Jackson street bridge, Chicago, 1514 tons, has been placed with the Mt. Vernon Bridge Company. The Rock Island

Bridge & Iron Company will furnish 126 tons for the Sacred Heart Academy at Fargo, N. D., and the Chicago, Indianapolis & Louisville has placed 124 tons of bridge spans. The 8560 tons of center sills purchased by the Chicago & Northwestern Railway will be fabricated by the American Car & Foundry Company. For Chicago delivery, from mill, we quote 1.38c. to 1.48c.

For Chicago delivery, from store, we quote 1.75c.

**Plates.**—Sheared plates continue weak and attractive tonnage would be welcome at 1.15c., Pittsburgh, although the Illinois Steel Company has advanced its prices to the basis of 1.20c., Pittsburgh. Tank plate orders are fair but the mills need steel car business. We quote for Chicago delivery, from mill, 1.33c. to 1.38c.

For Chicago delivery, from store, we quote 1.75c.

**Sheets.**—The market for sheets is well established and the local mills are finding that despite the occasional report of concessions orders at full prices are exceeding shipments in tonnage. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.63c.; No. 28 black, 2.18c.; No. 28 galvanized, 3.18c.

For sheets out of store we quote for Chicago delivery as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.45c. to 2.55c.; No. 28 galvanized, 3.50c. to 3.60c.

**Bars.**—The mills are so well satisfied with the steel-bar business now on the books that prices for bars are held on a parity with shapes. Bar iron also shows an upward tendency in prices and the 1.10c. quotation appears to have disappeared, with 1.12½c. a firm minimum. Manufacturers of hard steel bars are cleaning up their bedstead and agricultural implement business in anticipation of the spring demand for reinforcing bars. We quote for mill shipment as follows: Bar iron, 1.12½c. to 1.17½c.; soft steel bars, 1.38c. to 1.43c.; hard steel bars, 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 57 per cent. off.

**Hoops and Bands.**—With the advent of mill capacity in hoops and bands within the Western territory the selling of these materials has naturally become more aggressive. Despite the slump in the cooperage demand the past six weeks has brought out a marked increase in tonnage. The situation is not entirely free from concessions arising from a partial sacrifice of freight advantage, but for the most part bands are quotable at 1.20c. and hoops at 1.30c., Pittsburgh, with one-half standard classification extras and full extras respectively.

**Rivets and Bolts.**—Bolt specifications show more improvement than rivets and discounts for the former have been advanced. We quote from mill as follows: Carriage bolts up to ¾ x 6 in., rolled thread, 80-5; cut thread, 80; larger sizes, 75-5; machine bolts up to ¾ x 4 in., rolled thread, 80-10; cut thread, 80-5; larger sizes, 75-10; coach screws, 80-15; hot pressed nuts, square head, \$6.20 off per cwt.; hexagon, \$7 off per cwt. Structural rivets, ½ to 1¼ in., 1.73c. to 1.78c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

Out of store we quote for structural rivets 2.40c. and for boiler rivets, 2.60c. Machine bolts up to ¾ x 4 in. 70-10-10; larger sizes 70-12½; carriage bolts up to ¾ x 6 in. 75-10; larger sizes 70-12½ off. Hot pressed nuts, square head, \$5.50, and hexagon, \$6.20 off per cwt.

**Wire Products.**—Preparations for the spring retail trade are responsible for a well-sustained volume of business in wire products. Shipments of mixed carload lots are especially noteworthy. The demand for fencing and for plain wire for fabrication into fencing is unusually heavy. We quote to jobbers as follows: Plain wire No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78; galvanized, \$2.18; polished staples, \$1.78; galvanized, \$2.13, all Chicago.

**Cast-Iron Pipe.**—The bids taken at Columbus, Ohio, on 1200 tons last week were rejected. This week prices are being taken on 1300 tons at Duluth, 2600 tons at Akron, Ohio, of which 1100 tons is 30-in. and 700 tons at Kansas City. The Massillon Steel & Iron Company was awarded 300 tons for Munising, Mich. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$27; 6 to 12 in., \$25; 16 in. and up, \$24, with \$1 extra for gas pipe.



**Old Material.**—The temptation to realize upon their holdings of scrap at the high levels to which the market had been forced proved too strong to be resisted. With surprising quickness the local market developed an eagerness to sell, and in consequence declines of 25c. to 50c. a ton have been recorded in most of the important items. New railroad lists include 4000 tons from the Santa Fe, 500 tons from the Soo and an open list from the Lake Shore. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$13.25 to \$13.75
Old steel rails, rerolling	12.00 to 12.50
Old steel rails, less than 3 ft.	11.25 to 11.75
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	12.50 to 13.00
Heavy melting steel scrap	10.50 to 11.00
Frogs, switches and guards, cut apart	10.50 to 11.00
Shoveling steel	9.75 to 10.25
Steel axle turnings	7.25 to 7.75

Per Net Ton	
Iron angles and splice bars	\$13.25 to \$13.75
Iron arch bars and transoms	13.25 to 13.75
Steel angle bars	9.75 to 10.25
Iron car axles	18.50 to 19.00
Steel car axles	13.75 to 14.25
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	9.25 to 9.50
Cut forge	9.25 to 9.75
Steel knuckles and couplers	9.75 to 10.25
Steel springs	10.50 to 10.75
Locomotive tires, smooth	10.75 to 11.25
Machine shop turnings	5.75 to 6.25
Cast borings	5.50 to 6.00
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.75 to 7.25
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	10.75 to 11.25
Stove plate and light cast scrap	9.75 to 10.25
Grate bars	9.50 to 10.00
Railroad malleable	10.50 to 11.00
Agricultural malleable	9.00 to 9.50
Pipes and flues	8.00 to 8.50

## Philadelphia

PHILADELPHIA, PA., February 17, 1914.

The pig-iron movement continues at a fair rate, with the scene of activity shifted from foundry to steel-making grades. Heavy sales of basic have been made at an advance of 25c. Quiet buying by some consumers is still a feature. All pig-iron prices are stiffer. Business in semi-finished steel has been better, and prices of open-hearth billets are up \$1 a ton. The movement in finished materials is fair but shows irregularity, both in demand and prices. New business in plates and shapes has been spotty, although some makers are receiving a fair tonnage in new orders. Mill operations generally have been fairly well maintained. Iron bars show more strength. Coke, both foundry and furnace, has been in better demand. The old material market shows little change.

**Iron Ore.**—The demand continues light, consumers still awaiting developments in general trade conditions. Importations in the week ended February 14 were confined to a cargo of 4700 tons of Cuban ore.

**Pig Iron.**—Interest the past week has been centered in steel-making irons. Heavy sales of basic and low-phosphorus iron are reported. Total sales of basic on the recent movement will probably exceed 30,000 tons. About 10,000 tons was quietly taken some two weeks ago at \$14 delivered, while more recent sales include one of 8000 tons and two of 7000 tons each, which were sold at \$14.25 delivered. Of this tonnage 14,000 tons was for central Pennsylvania delivery, the remainder being sold to a New Jersey consumer. One central Pennsylvania consumer and a local buyer are still in the market for moderate quantities. Makers of basic are now pretty well sold up for the next few months and have marked quotations up to \$14.50 delivered, which they appear to be holding pretty firmly. Standard analysis low-phosphorus iron is selling in moderate quantities, seldom exceeding a few hundred tons, for near future delivery and is gradually growing scarcer, one important Eastern furnace being temporarily out of blast for repairs. Prices are firm at \$21 to \$21.25 delivered here. Lebanon Valley low-phosphorus pig has been more active, one producer selling upward of

8000 tons last week, including several 1000-ton lots, at \$17.50 furnace. The principal inquiry before the trade in foundry iron is that of the Pennsylvania Railroad for 3700 to 7400 tons, mixed grades, for second quarter delivery, contracts for which have not yet been closed. Several other good inquiries for the higher grades of foundry iron are out. Cast-iron pipe makers are still in the market, the largest inquiry being for 1500 tons. One upper Delaware River pipe maker closed recently for 5000 tons of low grade while one lower Delaware River foundry, which has been negotiating for some time, purchased 2000 tons, mixed No. 3 and forge, at \$14.25 delivered. Sales of the higher foundry grades have been chiefly in moderate lots. A fair volume of carload business is also moving. Prices are decidedly firmer. Eastern Pennsylvania No. 2 X foundry is strong at \$15 delivered as a minimum, with the majority of sellers holding at \$15.25 for first and \$15.50 for second quarter. A recent low-price seller has advanced 25c. a ton and is now practically in line with the \$15 delivered price for No. 2 X. While the bulk of the sales have been confined to first quarter deliveries some little second quarter buying has been done, in which case \$15.50 delivered was paid for standard No. 2 X. Virginia foundry irons have been fairly active, particularly for New England and New Jersey delivery, moderate tonnages only being done in this immediate district. Virginia producers hold the recent \$12.75 furnace basis, equal to \$15.55 to \$16 delivered here, for both No. 2 X and No. 2 plain with firmness, and some producers ask an advance of 50c. for strictly second quarter shipment. Rolling mill forge, following recent heavy sales, has been quiet. The following range of prices about represents the market for standard brands, delivered in buyers' yards in this district:

Eastern Penna. No. 2 X foundry	\$15.00 to \$15.50
Eastern Penna. No. 2 plain	14.75 to 15.25
Virginia No. 2 X foundry	15.55 to 16.00
Virginia No. 2 plain	15.55 to 16.00
Gray forge	14.00
Basic	14.25 to 14.50
Standard low phosphorus	21.00 to 21.25

**Ferroalloys.**—The movement in ferromanganese has quieted down, although some small business, principally in the West, is still under negotiation. While prices of foreign 80 per cent. ferromanganese are generally held at \$40, seaboard, prompt business, at least with one seller, can be done at \$39. Practically no interest is being shown by consumers of ferromanganese in this district. Small sales of blast-furnace ferrosilicon are reported at \$24.30 here for 12 per cent.

**Billets.**—Following recent heavy sales, makers of basic open-hearth rolling billets have advanced prices \$1 a ton and have made moderate sales on the new basis. Specifications for both rolling and forging billets have been better and some of the small mills are less able to make good deliveries. The leading producer in the East, however, while in materially better position, has not resumed full-capacity operations. Prices are decidedly stronger, basic open-hearth rolling billets commanding from \$23.40 to \$24, delivered, according to specifications, with forging steel holding at the usual advance of \$4 to \$5 a ton.

**Bars.**—Iron bar mills are receiving a fair run of orders for small and moderate lots, principally for early delivery. Mill operations are on a slightly better basis and more buying, together with higher prices for crude material, has stiffened the market. Ordinary iron bars are quote at 1.27½c. to 1.32½c., delivered here, with better grades at 1.32½c., minimum. Steel bars have been in fair demand at unchanged prices.

**Coke.**—More inquiry has come out for both furnace and foundry grades. One inquiry is for 25,000 tons of furnace coke for second quarter. Small contracts have been closed at \$2, at oven, and some spot sales were made at \$1.85 to \$1.90, but makers are not offering very freely. Foundry coke is held at \$2.50 to \$2.85, at oven, one contract for 1000 tons being taken at the outside figure. The following range of prices, per net ton, is named for deliveries in buyers' yards in this district:

Connellsville furnace coke	\$3.90 to \$4.40
Connellsville foundry coke	4.80 to 5.15
Mountain furnace coke	3.60 to 4.10
Mountain foundry coke	4.50 to 4.85

**Plates.**—A comparatively fair volume of business continues to come to the mills. One order for about 8000 tons of ship plates is reported placed with an Eastern maker, but most orders taken have been relatively small. Efforts to get prices on a higher basis have not been uniformly successful, reports being to the effect that the recent minimum can still be had, and if the business was particularly desirable might be shaded. On current business, however, makers hold firmly at 1.35c. to 1.40c., delivered here, the top price ruling on contracts involving forward delivery.

**Structural Material.**—While immediate business in plain shapes has been somewhat lighter, fabricators are more encouraged with the prospect for business as the building season opens. The high school proposition in Washington, D. C., involving about 1000 tons, is again up, while the proposed Weidener Building in this city will require probably 5000 tons. The demand for bridge material is still confined to small propositions. Specifications on plain shapes have been coming out more freely and mills are somewhat better engaged. Prices of plain shapes are unchanged at 1.35c. to 1.40c., delivered here.

**Sheets.**—Business has been fairly active, but mainly of the day-to-day small lot class. Specifications have been good and mills have been able to keep rolling schedules filled about a week ahead. Prices show a stronger tendency, but are unchanged at 1.55c. to 1.60c. for No. 10 blue annealed sheets, delivered in this district.

**Old Material.**—The situation in heavy melting steel is unchanged. Consumers keep out of the market, while transactions between dealers are frequently at a higher level, such purchases being diverted West where better prices are obtainable. Eastern mills contend that they will not pay over \$11 for No. 1 heavy melting steel. Increasing activity in rolling-mill stock has resulted in advances in a number of grades. A sale of 1000 tons of rerolling rails at \$13.50 is noted. Turnings and borings are in better demand at slightly higher figures. The following quotations about represent the market for deliveries in buyers' yards in this district, covering eastern Pennsylvania and taking freight rate varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel.....	\$11.00 to \$11.50
Old steel rails, rerolling.....	13.50 to 14.00
Low phosphorus heavy melting steel	
scrap (nominal) .....	14.50 to 15.00
Old steel axles .....	17.00 to 17.50
Old iron axles .....	23.00 to 24.00
Old iron rails .....	16.50 to 17.00
Old carwheels .....	12.75 to 13.25
No. 1 railroad wrought.....	14.50 to 15.00
Wrought-iron pipe .....	11.00 to 11.50
No. 1 forge fire .....	10.00 to 10.50
Bundled sheets .....	10.00 to 10.50
No. 2 light iron (nominal).....	5.00
No. 2 busheling (nominal).....	8.50 to 9.00
Wrought turnings .....	9.25 to 9.75
Cast borings .....	9.50 to 10.00
Machinery cast .....	13.00 to 13.50
Grate bars, railroad.....	9.50 to 10.00
Stove plate .....	10.00 to 10.50
Railroad malleable .....	10.00 to 10.50

## Cleveland

CLEVELAND, OHIO, February 17, 1914.

**Iron Ore.**—More underground mines have been shut down recently, and some ore firms reported that fully one-third of the mines from which they sell the output are not now being operated. At the opening of navigation a year ago stock piles were large, but next May they are expected to be smaller than at the corresponding date for several years. The price subject is not yet being considered. We quote 1913 prices as follows: Old range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; old range non-Bessemer, \$3.50; Mesaba non-Bessemer, \$3.40.

**Pig Iron.**—Cleveland furnaces have advanced prices 25c. to 50c. a ton and are now quoting No. 2 foundry at \$14, delivered Cleveland. A week ago one seller announced an advance to \$13.50 for outside shipment. Another interest has made a similar advance, so that that price is now the uniform quotation for outside shipment. The only large transaction is the purchase of foundry iron for the second quarter requirements of its Cleveland plant by the Westinghouse Electric & Mfg. Company. It divided about 6000 tons between

two Cleveland furnace companies at \$13.50, delivered, this quotation having been made before the advance in prices. It is understood that the company decided not to buy at present for the last half because of the advance in prices asked for that delivery. In the Mahoning Valley the market is firm at \$13.25 to \$13.50, having stiffened up owing to the fact that some producers have advanced their quotation to \$13.50. In Toledo sales are being made at \$13.50. Southern iron is firmer, most producers asking \$11, Birmingham, for No. 2, \$10.75 being the minimum quotation. We quote delivered Cleveland as follows:

Bessemer .....	\$15.15
Basic .....	14.00
Northern No. 2 foundry.....	14.00
Southern No. 2 foundry.....	\$15.10 to 15.35
Gray forge .....	13.00
Jackson County silvery, 8 per cent.	
silicon .....	17.30 to 17.55

**Coke.**—Several foundries in the Cleveland district have placed contracts for Virginia coke at \$2.75 at oven for the year, beginning July 1 next. Generally the market is not active. We quote standard Connellsville foundry coke at \$2.50 to \$2.75 and furnace coke at \$1.85 to \$2 per net ton at oven.

**Bolts and Rivets.**—The demand for bolts is active and the market is firmer. Rivet prices are unchanged at 1.65c. for structural and 1.75c. for boiler, shaded \$1 a ton for desirable orders. We quote mill discounts as follows: Common carriage bolts,  $\frac{3}{4}$  x 6 in. smaller or shorter, rolled thread, 80 and 5 per cent.; cut thread, 80 per cent.; larger or longer, 75 and 5 per cent.; machine bolts with h.p. nuts,  $\frac{3}{4}$  x 4 in., smaller or shorter, rolled thread, 80 and 10 per cent.; cut thread, 80 and 5 per cent.; larger or longer, 75 and 10 per cent.; coach and lag screws, 80 and 15 per cent.; square h.p. nuts, blank or tapped, \$6.30 off; hexagon h.p. nuts, blank or tapped, \$7.20 off; c. p. c. and t. square nuts, blank or tapped, \$6 off; hexagon,  $\frac{3}{4}$  in. and larger, \$7.20 off; 9/16 in. and smaller, \$7.80 off; semi-finished hexagon nuts,  $\frac{3}{4}$  in. and larger, 85, 10 and 5 per cent.; 9/16-in. and smaller, 85, 10, 10 and 5 per cent.

**Old Material.**—The market has quieted down somewhat, following the recent excitement among dealers. Producers generally are still holding their material. Further advances in prices have been made on several grades and it is believed that quotations will remain at about the present level for a time. Heavy steel scrap is reported sold at \$12 and higher, but some mills are offering only \$11.50 and some dealers are asking \$12.50. Turnings have been active, but local mills are now filled up on that grade. Wrought scrap is in good demand. We quote f.o.b. Cleveland as follows:

Per Gross Ton	
Old steel rails, rerolling .....	\$12.00 to \$12.50
Old iron rails .....	13.50 to 14.00
Steel car axles .....	17.00 to 18.00
Heavy melting steel .....	11.00 to 11.50
Old carwheels .....	12.00 to 12.50
Relaying rails, 50 lb. and over.....	23.00 to 25.00
Agricultural malleable .....	9.00 to 9.50
Railroad malleable .....	11.50 to 11.75
Light bundled sheet scrap .....	7.00 to 7.50
Bundled tin scrap .....	11.00 to 11.50

Per Net Ton	
Iron car axles .....	\$20.00 to \$21.00
Cast borings .....	6.50 to 7.00
Iron and steel turnings and drillings	6.50 to 7.00
Steel axle turnings .....	7.00 to 7.50
No. 1 busheling, new.....	10.00 to 10.50
No. 1 busheling, old.....	9.50 to 10.00
No. 1 railroad wrought .....	11.75 to 12.25
No. 1 cast .....	11.50 to 11.75
Stove plate .....	9.00 to 9.50

**Finished Iron and Steel.**—Specifications are coming out in good volume, but new business has fallen off, probably due to the fact that most consumers have their requirements under contract. While the market is firmer, 1.20c. Pittsburgh, is still being commonly quoted for steel bars, plates and structural material for desirable orders for early delivery. Some second quarter contracts are being made at 1.25c. A fair volume of structural work has come out. The Toledo Bridge & Crane Company has taken 700 tons for a factory building for the Wyllis Overland Company, Toledo, while 175 tons for a building for the Morrow Mfg. Company, Elmira, N. Y., an affiliated concern, has been taken by the American Bridge Company. Cleveland fabricators have taken contracts for three ore and coal bridges requiring



about 1400 tons. The Van Dorn Iron Works has taken 150 tons for a bridge in Cleveland. Sheets are quiet; minimum quotations are 1.90c. Pittsburgh, for No. 28 black and 2.90c. for No. 28 galvanized for desirable orders for early delivery, some business being taken at prices \$2 per ton higher. Bar iron is quiet, with quotations at 1.20c. to 1.25c., Cleveland. Stock prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

## Cincinnati

CINCINNATI, OHIO, February 19, 1914.—(By Wire.)

**Pig Iron.**—From a strictly price standpoint the Southern market shows improvement. While offers of warrant iron are made at \$10.50, Birmingham basis, for nearby shipment, as far as can be ascertained the majority of Southern furnaces are asking \$11 accepting business below this figure where firm offers are made, but only for first half shipment. An advance to \$11.50 has been made by one interest not desiring any prompt business, but no sales have been made on this basis. A Kentucky melter has bought 1500 tons of Southern iron made up of mixed grades, all for first half delivery. Approximately 500 tons of No. 2 soft was taken by a southern Ohio company, and a like quantity of No. 2 foundry went to a southern Indiana consumer. The quiet buying that characterized the market a short time ago now appears to have subsided and there is also a smaller quantity of business openly under negotiation. One of the largest general inquiries reported is from southern Indiana for 1000 tons of foundry iron to be shipped before July 1. Northern foundry and basic remain at \$13, Ironton, for first half shipment, and no rumors are now circulated that this price is being shaded, as was the case two weeks ago. Neither Northern nor Southern producers are willing to quote foundry iron for third and fourth quarter shipment, except at an advance over present prices, although there has been a considerable quantity of basic sold in this territory for that delivery. In fact, only about 10,000 tons remains to be purchased by nearby rolling mills to fill requirements for the entire year. Malleable continues dull, but there is a small inquiry from St. Louis territory. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$14.25 to \$14.75
Southern coke, No. 2 f'dry and 2 soft.	13.75 to 14.25
Southern coke, No. 3 foundry.	13.25 to 13.75
Southern, No. 4 foundry.	12.75 to 13.25
Southern gray forge	12.25 to 12.75
Ohio silvery, 8 per cent. silicon.	17.20 to 17.70
Southern Ohio coke, No. 1.	15.20 to 15.70
Southern Ohio coke, No. 2.	14.20 to 14.70
Southern Ohio coke, No. 3.	13.95 to 14.20
Southern Ohio malleable Bessemer.	14.20 to 14.70
Basic, Northern	14.20 to 14.70
Lake Superior charcoal.	16.25 to 17.25
Standard Southern carwheel.	27.25 to 27.75

(By Mail)

**Coke.**—A number of requests to hold up shipments on foundry coke are reported, but weather conditions doubtless have something to do with this. As a rule, the foundries are fairly well contracted ahead, and the delay in shipments does not indicate that the melt of iron is smaller than it was a month ago. As a matter of fact, an improvement has been noted in this section, but with the stove foundries leading, as has been the case for the past 12 months. The consumption of domestic coke is above the average, and, to a limited extent, it has been an outlet for several producers who had coke loaded for other consumers. Prices continue firm, with Connellsville 48-hr. brands quoted around \$1.90 to \$2 per net ton at oven, and Wise County and Pocahontas prices about 15c. a ton higher. Foundry coke is almost the same in the three districts, averaging from \$2.50 to \$2.75 per net ton at oven. Pocahontas and Wise County producers are generally holding out for the last-named price.

**Finished Material.**—Structural shapes are in poor demand. Very little building is going on now, due to the weather conditions, and this has cut off the less-than-carload call for small beams and channels that the local warehouses have heretofore reported as being above the ordinary. Reinforcing concrete bars are also

somewhat of a drag just now, and there is practically no demand for railroad track material, except to cover urgent requirements. Black and galvanized sheets are firm around 2.15c. to 2.20c. for the former and 3.15c. to 3.20c. for the latter, both f.o.b. cars Cincinnati, or Newport, Ky. Shipments of both black and galvanized sheets are holding up well, and there is a fair-sized inquiry for carload quantities, with the mills still unwilling to contract for strictly third and fourth quarter business. The local warehouse price on steel bars is around 1.75c. to 1.80c.

**Old Material.**—To a large extent the sharp advance in quotations named last week is attributed to speculation. Prices have softened somewhat but they cannot be changed, as most of the material moving is on a much higher level than 30 days ago. As far as can be ascertained, there have been few reductions made in the last quotations. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton	
Bundled sheet scrap	\$7.50 to \$8.00
Old iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up.	20.50 to 21.00
Revolving steel rails	11.50 to 12.00
Melting steel rails	10.00 to 10.50
Old carwheels	11.00 to 11.50
Per Net Ton	
No. 1 railroad wrought	\$9.50 to \$10.00
Cast borings	5.75 to 6.50
Steel turnings	5.75 to 6.50
No. 1 cast scrap	10.00 to 10.50
Burnt scrap	6.75 to 7.50
Old iron axles	17.00 to 17.50
Locomotive tires (smooth inside)	10.50 to 11.00
Pipes and flues	6.50 to 7.00
Malleable and steel scrap	7.75 to 8.25
Railroad tank and sheet scrap.	5.50 to 6.00

## Birmingham

BIRMINGHAM, ALA., February 16, 1914.

**Pig Iron.**—Producers of pig iron are not doing a great deal of business in the middle West on account of freight rates, which render competition with northern and western makers impossible at the \$11 basis. Concessions from this price have been necessary where business is done in closely competitive territory. A leading company continues to note the absence of the smaller consumers, but another interest reports a number of them as recent purchasers. In one case an offer of \$10.75 for 1000 tons of No. 2 foundry was declined and \$11 named. The order was not given. Birmingham manufacturers do not admit having sold under \$10.75, although it is not denied that some Tennessee iron and some resale iron have changed hands under that figure. It is becoming more difficult to set definite prices on Southern pig iron. In the first place, some concerns get more than others for particular grades; in the second place, prices for non-competitive territory are higher than in competitive, and the competitive field is avoided as long as the non-competitive takes the output. As a general proposition, Alabama manufacturers have but a third of their make for competitive territory, and much of this is taken up by the large buyers. Smaller consumers who desire Southern iron in their mixture frequently pay on the basis of the Southern delivery price. Transactions recently have been largely in Southern territory and have been on the \$11 basis. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

No. 1 foundry and soft.	\$11.25 to \$11.50
No. 2 foundry and soft.	10.75 to 11.00
No. 3 foundry.	10.25 to 10.50
No. 4 foundry.	10.00 to 10.25
Gray forge	9.75 to 10.00
Basic	10.50 to 10.75
Charcoal	23.50 to 24.00

**Cast-Iron Pipe.**—The manufacturers of water and gas pipe report better conditions both as concerns orders and prices. A good deal of Western business has been placed and several Southern cities have come into the market. There is also a good prospect of Cuban contracts both in soil and water pipe. The plants are operating on full time and are not accumulating stock. We quote per net ton f.o.b. pipe yards as follows: 4 in., \$22; 6 in. and upward, \$20, with \$1 added for gas pipe.

**Coal and Coke.**—The coal and coke output have been restricted by the decreased demand. Recent cold weather has slightly stimulated the domestic coal market, but otherwise business is dull, except with the large contract mines. Coke is weak. Prices vary in Southern coke fields on account of the differentials in ash. Transactions in furnace coke are limited because most iron operators make their own coke. We quote per net ton f.o.b. ovens as follows: Furnace coke, \$2.50 to \$2.75; foundry, \$3.25 to \$3.75.

**Old Material.**—The old material market has shown some signs of life and recent transactions are of considerable volume. Quotations vary and actual sales have shown some range. We quote per gross ton f.o.b. dealers' yards as follows:

Old iron axles (small).....	\$15.00 to \$15.50
Old steel axles (light).....	15.00 to 15.50
Old iron rails.....	12.50 to 13.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.00 to 10.50
No. 1 country wrought.....	9.00 to 9.50
No. 2 country wrought.....	9.50 to 10.50
No. 1 steel scrap.....	8.50 to 9.00
Tram carwheels.....	9.50 to 10.00
Standard carwheels.....	10.50 to 11.00
Stove plate.....	8.50 to 9.00

## St. Louis

ST. LOUIS, MO., February 16, 1914.

**Pig Iron.**—The aggregate sales for the week will probably be about 10,000 tons of all grades. A tentative inquiry is in the market for an indefinite tonnage of malleable iron. Aside from the fact that a few recent sales have, through the medium of differentials and partly through the quality of the iron, been somewhat below standard grade prices, there appears to be nothing to lead to expecting a real cut. The lowest figure made is \$10.50 for No. 2 Southern foundry, Birmingham basis, and a number of furnace representatives are under orders to hold to \$11. No. 2 Ohio, Ironton basis, foundry iron has firmed up to \$13.25 and No. 2 X Chicago, which weakened to \$13.75, is again back to \$14 in this market.

**Coke.**—There has been considerable contracting by foundries, but mostly in the nature of renewals of old contracts. By-product coke is quoted on the Connells-ville basis.

**Old Material.**—Dealers continue anxious to get the material and there is considerable competition on lots offered for sale. The lists of the railroads reported last week went at the highest prices since the present upward movement began. It is for the moment something of a dealers' market. The consumers are anxious to get material in many instances, but are hesitant about paying the dealers' prices. The foundries and steel plants are the most active in the demand, but the rolling mills are making some appearance in the market. Relaying rails are in strong demand and continue scarce. Lists out include 1000 tons from the P. C. & St. L. and 200 tons additional from the M. & O. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton	
Old iron rails.....	\$12.00 to \$12.50
Old steel rails, rerolling.....	12.00 to 12.25
Old steel rails, less than 3 ft.....	11.25 to 11.50
Relaying rails, standard section, subject to inspection.....	23.00 to 24.00
Old carwheels.....	12.00 to 12.25
No. 1 railroad heavy steel scrap.....	11.00 to 11.50
Shoveling steel.....	10.00 to 10.25
Frogs, switches and guards cut apart.....	11.00 to 11.25
Bundled sheet scrap.....	5.50 to 6.00
Per Net Ton	
Iron angle bars.....	\$11.00 to \$11.50
Steel angle bars.....	9.50 to 10.00
Iron car axles.....	18.50 to 19.00
Steel car axles.....	13.50 to 14.00
Wrought arch bars and transoms.....	13.00 to 13.50
No. 1 railroad wrought.....	9.50 to 10.00
No. 2 railroad wrought.....	9.00 to 9.25
Railroad springs.....	9.50 to 10.00
Steel couplers and knuckles.....	9.50 to 10.00
Locomotive tires, 42 in. and over, smooth.....	10.50 to 11.00
No. 1 dealers' forge.....	8.00 to 8.50
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	8.50 to 9.00
No. 1 boilers, cut to sheets and rings.....	6.50 to 7.00
No. 1 cast scrap.....	10.50 to 11.00
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	9.00 to 9.25
Agricultural malleable.....	8.50 to 9.00
Pipes and flues.....	7.00 to 7.25
Railroad sheet and tank scrap.....	7.00 to 7.25
Railroad grate bars.....	8.25 to 8.50
Machine shop turnings.....	5.50 to 6.00

**Finished Iron and Steel.**—Structural consumers have taken kindly to the advance to 1.25c., Pittsburgh, and have not, apparently, held off on orders. Fabricating shops continue busy and are reported figuring on new business of considerable total volume to come out with the breaking of winter. The demand for bars, both ordinary and reinforcing, is good for the season. In standard steel rails the chief inquiry in the market is for 6000 tons for a Kansas line. Warehouses are preparing to fill out their stocks against future demands which they figure will develop before the spring is very far advanced.

## San Francisco

SAN FRANCISCO, CAL., February 10, 1914.

A gradual increase is noted in the number of inquiries for steel products, accompanied by the placing of scattered orders of more individual importance than has been the rule for the last few months. Large consumers show more interest in the market, though buying is confined pretty closely to near-by requirements. The nature and source of many new inquiries are regarded as highly encouraging. The advance in mill prices, though firmly maintained by agents, has had practically no effect on the local jobbing market, and few merchants have made any departure from their waiting policy.

**Bars.**—A heavy tonnage of foreign bars is now arriving, and business placed with Eastern mills is confined to narrow limits. General jobbing trade has not yet started on a large scale, but some buyers who have long been out of the market are figuring on their spring requirements. Jobbing prices have not improved. Business in reinforcing bars is checked by the prospect of getting this material from Europe, as importers are said to have made some very attractive prices, and the position of local manufacturers is somewhat uncertain. A fair tonnage, however, has been placed recently.

**Structural Material.**—Business is decidedly quiet, little of importance being in sight. Fabricating contracts let within the last fortnight are few and insignificant. One of the principal jobs likely to come up this spring is a 10-story building for the Fireman's Fund Insurance Company. Plans are under way for the I. W. Hellman residence, a large class A building. City school work, for which plans are about ready, will require about 300 tons, and tentative plans are under consideration for a large library at Stanford University. Negotiations have been practically completed for the construction of the new Southern Pacific passenger station, in which some steel will probably be required. An inquiry is expected shortly for a 12-story building in Los Angeles, and arrangements are being made there for the construction of a 10-story building.

**Rails.**—Small business in light rails is coming out fairly well, with a rapid increase in inquiries. Logging concerns are again getting into the market, and several good sales have been made in the mining districts, especially in Nevada. Some foreign rails are being purchased, and this competition has forced concessions in American mill prices, with indications that the competition will be still keener. Comparatively little has been done in standard sections, as expected inquiries from the interurban lines are slow to appear.

**Sheets.**—Mill prices are firmly maintained, but new business is coming out rather slowly. Specifications, though somewhat larger than last month, are hardly normal. So far the low prices quoted on German black sheets have had no effect in this market, former experience with this material having been rather unsatisfactory, but it is believed in some quarters that this factor will be of more or less importance after the opening of the Panama Canal.

**Standard Pipe.**—All mill agents are holding rigidly to the new prices, and business shows a barely perceptible improvement over last month. Most jobbers have light stocks and have not yet commenced to buy beyond current needs.

**Pig Iron.**—The foundries are still running on a small scale. Prospects for foundry work, however, are en-



couraging, and more activity is expected in the spring. Offerings of foreign iron show little reduction and prices are low and irregular.

**Plates.**—The jobbing movement has not revived, but small consumers find a little more work than last month, and some improvement is expected shortly. Merchants are buying sparingly and so far few large orders have been placed by local manufacturers, though the outlook for tank and pipe business is good. The Standard Oil Company is said to have purchased about 800 tons for additional tanks at the Richmond plant, and is preparing to build a large distributing plant at Eureka, Cal. The Pacific States Refineries is also preparing to rebuild its plant at Oakland, which burned recently. The city of Los Angeles is taking bids on 5920 ft. of 52-in. riveted pipe, to be built of  $\frac{1}{4}$ -in. plates.

**Cast-Iron Pipe.**—The city of Sacramento is taking bids on 1000 ft. each of 6, 8, 10, 12 and 14 in. pipe. Victoria, B. C., will take bids February 23 for 230 tons.

**Coke.**—The demand is light, with supplies considerably in excess of current needs. Quotations remain nominally at the former level, spot offerings being held at \$13 to \$14 per net ton, ex yard, and German Syndicate coke, to arrive, at \$11 to \$12 per gross ton.

**Old Material.**—Steel melting scrap is getting down to a little more definite basis of values and shows more strength than at the beginning of January. Some business has been done, though no important transactions are reported. A general average for the various classes of melting scrap is about \$9 per gross ton, boiler scrap having been sold around \$8, while melting rails and some other especially desirable lines are held at \$11 to \$12, and offers of \$7 are reported for structural scrap. There is more demand for steel scrap on the Pacific coast than there was a few years ago, when a heavy tonnage was shipped out, and the larger holders take a firm view of the situation. Cast-iron scrap is quiet, but dealers are holding steadily to the quotation of \$17 per net ton. Re-rolling rails are scarce and firm at \$16 per net ton, and wrought scrap remains at a range of \$13 to \$15.

## New York

NEW YORK, February 18, 1914.

**Pig Iron.**—Quietness in pig iron in this market is more pronounced. Developments in which local sellers show an interest have been largely in eastern Pennsylvania districts. Little is known concerning the International Steam Pump Company's recent inquiry calling for deliveries over the greater part of the year, and nothing is likely to be announced concerning these purchases when they are made. Some inquiry has come out from New Jersey foundries, and Virginia iron is included in the brands desired. Virginia furnaces are quoting \$12.75 and as high as \$13 at furnace for No. 2 X; deliveries for the second quarter could be had at the latter figure and something less. Buffalo iron has figured to a small extent in the past week's business in the New York district and New England. Prices are practically unchanged, and there is little sign of renewed activity in buying. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$14.75 to \$15; No. 2 X, \$14.50 to \$14.75; No. 2 plain, \$14.25. Southern iron is quoted at \$15 to \$15.25 for No. 1 and \$14.75 to \$15 for No. 2.

**Finished Iron and Steel.**—Sellers have not been disappointed in expecting a lull, though heavy specifications on contracts have made up in part for the lack of new business. The situation is not tending toward stiffening prices and instances were learned of both bars and shapes going at 1.15c., Pittsburgh, one of these involving no more than 50 or 60 tons of structural material which was taken at 1.15c. for immediate shipment. Little new structural business has appeared, but mention may be made of 1300 tons for a bridge at Norfolk, Va., being inquired for by Dodge Brothers, Norfolk; 600 tons for two transfer bridges at Weehawken, for the New York Central; 300 tons for 11 bridges for the New York Central, and 175 tons for the Erie Railroad at Military road, Buffalo. Further large struc-

tural inquiries will shortly come on the market for third tracking the Manhattan elevated railroads, involving close to 50,000 tons, for which the general contract has been placed on a percentage basis with the T. A. Gillespie Company and others. This same company has also closed for the Gatineau Lakes water supply, involving 40,000 to 45,000 tons of plates, which have been placed in Pittsburgh, but which will be delivered over a period of 18 months. The Levering & Garrigues Company has taken over 3000 tons, about half for the Astor loft building, West Thirty-third street, and the remainder for a transformer building for the 201st street power house. Lewis F. Shoemaker & Co. have 100 tons for two bridges for the New Haven at Groton, Conn. In railroad cars the Barney & Smith Company have taken 30 passenger equipment cars for the Great Northern and the Standard Steel Car Company, 1000 cars for the Virginian. While there are not now so many cars actively before the market they are expected to be placed without regard to the postponement of the expected increase in freight rates. We quote mill shipments of steel bars, plates and structural material for early shipment at 1.20c., Pittsburgh, or 1.36c., New York, but 1.41c., New York, for second quarter; iron bars, 1.30c. to 1.35c., New York. We quote iron and steel bars from store, 1.90c. to 1.95c., and shapes and plates, 1.95c. to 2c.

**Ferroalloys.**—The recent movement in the market for 80 per cent. ferromanganese, during which large sales were made, has become sufficiently a matter of history that a fair estimate can be made of its extent. Conservative judgment seems to indicate that the total sales did not greatly exceed 50,000 tons, calling for delivery over all of 1914 with a small proportion to be delivered in 1915. Most of this was sold at \$36 to \$37, Baltimore. The present market price is \$39, seaboard, with some sales being made at \$1 above and below this figure, depending on conditions. The German producers are selling at practically the same figure as the English. Since last week a lot of 1000 tons of the foreign alloy has been sold and also a smaller amount aggregating 500 tons, some of which is understood to have been marketed by the domestic producer, whose price is reported to be \$42, Pittsburgh. Quotations for 50 per cent. ferrosilicon remain unchanged at \$73, Pittsburgh, for carloads; \$72 for 100 tons and \$71 for 600 tons and over.

**Cast-Iron Pipe.**—Fall River, Mass., will open bids February 21 on 500 tons of 6 to 12 in. The Newark, N. J., contract for 4500 tons was taken by a Philadelphia interest and the Worcester contract for 3200 tons went to the leading manufacturer. The Staten Island contract for flexible joint 36-in. has so far not been awarded to any pipe founder. While municipal lettings are fewer this week, private buying keeps up well. Although prices are showing rather more firmness, carload lots of 6-in. can still be had at \$22 to \$23 per net ton, tidewater.

**Old Material.**—Brokers appear to be better buyers than the consumers, offering somewhat higher prices than the latter are willing to entertain. It is understood, however, that the large consumers of scrap in eastern Pennsylvania are rapidly reducing their stocks and will be compelled soon to place contracts for replenishment. From present appearances they will be unable to buy at the prices they now have in mind. The rolling mills have bought sparingly of wrought pipe and cast borings, while some little movement has taken place in cast scrap. Quotations are unchanged as follows, per gross ton, New York:

Old girder and T rails for melting	\$9.00 to	\$9.50
Heavy melting steel scrap	9.00 to	9.50
Relaying rails	21.50 to	22.00
Re-rolling rails	11.00 to	11.50
Iron car axles	19.50 to	20.00
Steel car axles	13.50 to	14.00
No. 1 railroad wrought	11.50 to	12.00
Wrought iron track scrap	10.00 to	10.50
No. 1 yard wrought, long	9.50 to	10.00
No. 1 yard wrought, short	8.75 to	9.25
Light iron	4.00 to	4.50
Cast borings	6.50 to	7.00
Wrought turnings	6.50 to	7.00
Wrought pipe	8.75 to	9.25
Carwheels	12.00 to	12.50
No. 1 heavy cast, broken up	11.50 to	12.00
Stove plate	8.50 to	9.00
Locomotive grate bars	7.50 to	8.00
Malleable cast	8.00 to	8.50

## Pittsburgh

PITTSBURGH, PA., February 18, 1914.

The trade is now experiencing the lull that invariably follows a period of activity. In the last two weeks in January and the first few days of February there was active buying of pig iron, semi-finished steel and finished material to replenish stocks, and now conditions have quieted down. This does not indicate that any ground has been lost, but there is an absence of the active buying that has prevailed. It is evidently the object of the makers to put plates, shapes and bars on a 1.25c. basis for second quarter delivery, and some business is stated to have been taken for second quarter for these materials at that price. For very desirable orders and prompt shipment, structural material and plates can still be had at 1.20c. All grades of pig iron are firm and over 20,000 tons of foundry have been sold in the past week for first and second quarter delivery. Scrap has settled down, and the opinion is that prices are as high as they will go for the time being. Two sales of high grade furnace coke have been made for second quarter delivery, one at \$2.10 at oven and one at a slightly higher price. Operations among the mills this week are on a slightly increased basis, but it is still a question whether the improvement can go much further unless the railroads soon come in as buyers.

**Pig Iron.**—Most of the pig iron sold in the past week has been foundry grades, Bessemer and basic being quiet. The Westinghouse Electric & Mfg. Company bought for its Allegheny and East Pittsburgh shops 10,000 tons for second quarter delivery only, having deferred buying for third and fourth quarters as it intended. Of this iron 6000 tons came from Valley furnaces and 4000 tons from outside furnaces. This company buys what is known as Nos. 1, 2 and 3 iron, and based on the prices it paid, the No. 2 iron netted about \$13, Valley furnace. The Standard Sanitary Mfg. Company also bought 10,000 tons of Northern foundry iron for its Allegheny and New Brighton works. Most of the iron came from Valley furnaces on the basis of \$13 at furnace, and part of it came from outside furnaces. The Brier Hill Steel Company, Youngstown, sold to the Republic Iron & Steel Company 12,000 tons of Bessemer iron at \$14.25 at furnace, and sold 3000 tons to another consumer, but a deal for ingot molds was involved in this latter sale. We also note sales of about 300 tons of Bessemer iron for prompt delivery at \$14.25, Valley furnace. Early last week the Republic Iron & Steel Company bought 5000 tons of basic iron from the Brier Hill Steel Company and 5000 tons from the Ohio Iron & Steel Company at about \$13.25 at furnace. The only large inquiry in the market for basic is from the American Steel Foundries, which is figuring on buying 20,000 to 40,000 tons for its Sharon and Alliance works. No sales are reported of gray forge. We quote Bessemer iron at \$14.25; basic, \$13.25; No. 2 foundry, \$13.25 to \$13.50; gray forge, \$12.75 to \$13; malleable Bessemer, \$13.50 to \$13.75 for delivery through first half of this year, all at Valley furnace, the freight rate to the Pittsburgh or Cleveland district being 90c. a ton.

**Billets and Sheet Bars.**—There is not much inquiry for either billets or sheet bars, most consumers being covered by long time contracts at prices somewhat lower than are now being quoted. One leading consumer of sheet bars is covered to July at less than \$20.50 delivered, and another at slightly over \$20 delivered. Both Bessemer and open-hearth billets are being furnished on old contracts as low as \$19, delivered. Actual orders and specifications entered by the billet and rail sales bureau of the Carnegie Steel Company in the first half of February show a heavy increase over the same period in January. On new inquiries and for shipment in February and March we quote Bessemer and open-hearth billets at \$21 and Bessemer and open-hearth sheet bars at \$22, f.o.b. makers' mills, Pittsburgh or Youngstown, for this and next month, and \$1 a ton higher for second quarter. We quote forging billets at \$25 on desirable specifications, embracing only one size, and up to and not including 10 x 10 in., the regular extras being

charged for larger sizes. On small orders, forging billets are held at \$26. We quote axle billets at \$23 for desirable orders and \$24 for small orders. Pittsburgh and Youngstown mills are quoting \$22 for Bessemer and open-hearth billets and \$23 for Bessemer and open-hearth sheet bars for second quarter, but as yet very little business has been closed at these figures.

**Muck Bar.**—The advance in the price of forge iron has put up muck bar slightly, and we now quote best grades made from all pig iron at \$28.50 to \$29, delivered to consumers' mills in the Pittsburgh district. Eastern muck bar made from part scrap is being offered at about \$2 a ton less.

**Steel Rails.**—The order of the Pennsylvania Railroad for 1914 delivery has not yet come out, and disappointment is expressed over the slow manner in which rail business for this year's delivery is being placed. The new demand for light rails is good, the Carnegie Company having received new orders and specifications in the past week for close to 2500 tons. We quote splice bars at 1.50c. and standard section rails at 1.25c. Light rails, rolled from billets, are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

**Plates.**—The new demand for plates is better, and the mills are running more nearly full than for some months. The Riter-Conley Mfg. Company has taken steel tanks for Westinghouse, Church, Kerr & Co., Inc., and the Corona Company at Tampico, Mexico, requiring about 1200 tons, to be furnished by the Carnegie Steel Company. The Cambria Steel Company has taken 500 steel hopper cars for the Cambria & Indiana Railroad and the Virginian has placed 1000 steel gondolas with the Standard Steel Car Company. Bids will close February 24 for 22 steel coal barges to be built by the Government at its various navy yards, requiring about 4000 tons of plates and shapes. The T. A. Gillespie Company of this city is low bidder for building the riveted plate line for water supply to Ottawa, Canada, taking about 40,000 tons of plates, which will likely be rolled by Pittsburgh mills if the Gillespie Company gets the contract. Plates are still available at 1.20c. on desirable orders for prompt shipment, but the Carnegie Steel Company reports it is holding plates firm at 1.25c. and has booked orders for second quarter delivery at this price. We quote ¼-in. and heavier plates at 1.20c. for desirable orders for prompt shipment and 1.25c. for delivery in second half of the year.

**Structural Material.**—New inquiry is active, and the outlook this year for the spring trade is good. The American Bridge Company has taken 3500 tons for extensions to the May building at Cleveland and 500 tons for a runway for the National Supply Company at Toledo, Ohio. The Cambria Steel Company, Johnstown, Pa., has 1100 tons for a high school building in Buffalo, N. Y. Bids have closed for about 4000 tons for a new telephone building in this city. Prices are firm and we quote beams and channels up to 15 in. at 1.25c., f.o.b. Pittsburgh, but on a very desirable tonnage for prompt shipment 1.20c. could be done. On small lots as high as 1.30c. is being asked.

**Wire Rods.**—New inquiry is fairly active, and prices are firm. We note a sale of 200 tons of open-hearth rods for prompt delivery at \$26.50, Pittsburgh. We quote Bessemer, open hearth and chain rods at \$26.50 to \$27, but on a firm offer for a round tonnage \$26 could be done.

**Skelp.**—New demand is fairly heavy, reflecting the active conditions existing in the pipe market. A sale of 1000 tons of grooved steel skelp for March delivery is reported at 1.25c., delivered buyers' mill. Prices are firm and we quote: Grooved steel skelp, 1.25c. to 1.30c.; sheared steel skelp, 1.35c. to 1.40c.; grooved iron skelp, 1.65c. to 1.70c.; sheared iron skelp, 1.70c. to 1.75c., delivered to consumers' mills in the Pittsburgh district.

**Iron and Steel Bars.**—Makers report that new demand and specifications on both iron and steel bars are more active than at any time since last summer. One leading maker reports that orders and specifications for steel bars in the first half of February nearly



doubled the same period last month. There is also a heavy demand for reinforcing steel bars. The market on iron bars is firmer, and new demand is better than at any time for six months or more. We continue to quote steel bars for prompt shipment at 1.20c. to 1.25c. for delivery in second quarter. An importation of about 1200 tons of steel bars was recently made to San Francisco at a delivered price which would figure back to less than 1c. at Pittsburgh mills. The fact that this is being done not only on the Pacific coast, but at Eastern seaboard points, is taken to indicate no probability of high prices ruling this year at least. We quote common iron bars at 1.40c. to 1.45c., Pittsburgh.

**Sheets.**—Local makers and also Youngstown sheet mills report conditions better than at any time since last May or June. New demand is fairly active, but consumers are specifying heavily against contracts placed some time ago. The minimum on the market for No. 28 black sheets for February and March seems to be 1.95c., but on galvanized a few mills are naming 2.90c. For second quarter delivery mills are holding firm for 2c. on No. 28 black and 3c. on No. 28 galvanized. The American Sheet & Tin Plate Company is operating its sheet mills to 78 per cent. of capacity this week. The Youngstown Iron & Steel Company, which has eight sheet mills, and the Youngstown Sheet & Tube Company, which has 16 hot sheet mills, are running to full capacity. For delivery in first quarter we quote No. 28 Bessemer black sheets at 1.95c. to 2c.; No. 28 galvanized, 2.95c. to 3c.; Nos. 9 and 10 blue annealed sheets, 1.45c.; No. 28 tin mill black plate, H. R. and A., 1.90c. to 1.95c.; Nos. 29 and 30, 1.95c. to 2c. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

**Ferroalloys.**—The market has quieted down very much, and new inquiry is light. In the past week sales of probably 1000 tons of English 80 per cent. have been made at about \$39, seaboard. The Carnegie Steel Company is still out of the market as a seller. We quote English 80 per cent. ferromanganese at \$39, Baltimore, the same price being asked for German, with a freight rate to Pittsburgh of \$2.16 a ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72; over 600 tons, \$71, delivered in the Pittsburgh district. We quote 10 per cent. ferrosilicon at \$20; 11 per cent., \$21, and 12 per cent., \$22, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnaces. We quote 20 per cent. spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

**Tin Plate.**—Specifications are heavy from the large consumers that placed their contracts in December for delivery this year. New demand is quiet, as nearly all the tin plate that will be consumed this year is under contract. It is said that on a general average tin plate mills are operating to over 90 per cent. of capacity. On the small amount of new business being placed we quote 100 lb. cokes at \$3.30 to \$3.40 and 100 lb. ternes from \$3.20 to \$3.30 per base box, f.o.b., Pittsburgh.

**Wire Products.**—Local makers report they have entered a few small contracts for wire nails for delivery within 60 days from date at the full price of \$1.60 f.o.b. at mill. Specifications against contracts are coming in very freely. Shipments by the mills are heavier than at any time since last summer. All the makers state they are holding nails and wire strongly at the prices named below. We quote wire nails at \$1.60; plain annealed wire, \$1.40; galvanized barb wire and fence staples, \$2; painted barb wire, \$1.60, all per 100 lb. f.o.b., Pittsburgh, with actual freight charge to point of delivery, terms being 30 days net less 2 per cent. off for cash in 10 days. Cut nails are firmer, and we quote at \$1.60 to \$1.65, f.o.b., Pittsburgh. Discounts on woven wire fencing are 74 per cent. off in carload lots, 73 per cent. off on 1000-rod lots and 72 per cent. on less than 1000-rod lots, all f.o.b., Pittsburgh.

**Spikes.**—The Baltimore & Ohio has bought 20,000 to 25,000 kegs, most of the order going to the Jones &

Laughlin Steel Company. The Lake Shore has placed 3200 kegs with the same interest. The Erie bought recently 5000 kegs and other smaller contracts have been placed. Other roads are in the market for their supply of spikes for this year. The Great Northern wants 10,000 kegs and other roads smaller quantities. The spike makers are trying to limit sales for delivery in the first half of this year only, but in some cases orders have been taken for delivery throughout the year. Prices are firmer, and local spike makers have made a differential of 15c. a keg between standard sizes and small spikes. We quote standard sizes of railroad spikes in large lots at \$1.45 and small railroad and boat spikes at \$1.60 per 100 lb. f.o.b., Pittsburgh.

**Merchant Steel.**—The new demand is reported more active, and shipments by the mills are heavier than at any time since last summer. Prices are firmer, and a general advance is looked for in the near future. We quote: Iron finished tire, ½ x 1½ in. and larger, 1.35c., base; under ½ x 1½ in., 1.50c.; planished tire, 1.55c.; channel tire, ¾ to ¾ and 1 in., 1.85c. to 1.95c.; 1½ in. and larger, 1.95c.; toe calk, 1.95c. to 2.05c., base; flat sleigh shoe, 1.70c.; concave and convex, 1.75c.; cutter shoe, tapered or bent, 2.25c. to 2.35c.; spring steel, 1.95c. to 2.05c.; machinery steel, smooth finish, 1.80c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

**Old Material.**—The market has quieted down and indications are that prices are probably as high as they will go for the present. The demand for borings and turnings is quiet, and two prominent consumers will not pay as high prices as a week or 10 days ago. We note a sale of 1000 tons of busheling scrap at \$11, delivered; 4000 to 5000 tons of high grade melting scrap at \$13 delivered; 1500 tons at \$12.75 delivered; 500 tons of turnings at \$9.25 delivered, and 700 tons of low-phosphorus scrap at \$15.50 delivered. Dealers are quoting as follows per gross ton for delivery in the Pittsburgh and other districts:

Selected heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	\$12.75 to \$13.00
Compressed side and end sheet scrap	11.50 to 11.75
No. 1 foundry cast	12.00 to 12.25
No. 2 foundry cast	11.00 to 11.25
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	9.75 to 10.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	14.00 to 14.25
No. 1 railroad malleable stock	11.25 to 11.50
Grate bars	8.00 to 8.25
Low phosphorus melting stock	15.50
Iron car axles	24.25 to 24.75
Steel car axles	17.25 to 17.50
Locomotive axles, steel	21.25 to 22.50
Locomotive axles, iron	25.25 to 25.75
No. 1 busheling scrap	12.00 to 12.25
No. 2 busheling scrap	8.00 to 8.25
*Machine shop turnings	9.00 to 9.25
Old carwheels	11.75 to 12.00
*Cast-iron borings	9.00 to 9.25
†Sheet bar crop ends	13.25 to 13.50
Old iron rails	14.25 to 14.50
No. 1 railroad wrought scrap	13.50 to 13.75
Heavy steel axle turnings	9.75 to 10.00
Stove plate	8.00 to 8.25

\*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

**Coke.**—While the market is quiet, prices are firm, and we note two transactions in strictly high grade furnace coke that will probably have an important bearing on fixing prices for second quarter delivery. One of these involves 20,000 to 25,000 tons at \$2.10 per net ton at oven for second quarter and the other 15,000 to 20,000 tons at a price above \$2.15. This coke always commands the top of the market. Prices on prompt furnace coke seem to be slightly weaker, and it can be bought at \$1.80 to \$1.85 and some grades as low as \$1.75 at oven. New inquiry from the furnaces is light. There is a fair demand for foundry coke and prices are firm. We quote strictly standard furnace coke for delivery in first half of the year at \$2 to \$2.10 per net ton at oven, but some grades not as high in quality can be had at \$1.85 to \$1.90. We

quote strictly standard 72-hr. foundry coke at \$2.50 per net ton at oven to consumers, but some grades sell at 10c. to 15c. per ton less. The output of coke in the Upper and Lower Connellsville regions last week was 304,975 tons, an increase over the previous week of nearly 5000 tons.

**Shafting.**—Nearly all consumers are covered for first half, and makers of shafting report specifications against these contracts as coming in well. Prices are firmer, and the discount of 65 per cent. from list is no longer obtainable. We quote cold-rolled shafting in carload and larger lots at 63 to 64 per cent. and in small lots from 60 to 62 per cent. off delivered in base territory, depending on the order. One local maker of shafting is not quoting below 63 per cent. off in large lots.

**Hoops and Bands.**—The new demand for hoops and bands is confined mostly to small lots for prompt shipment, most large consumers having covered their needs through first quarter and in some cases through first half. We quote steel bands at 1.20c. to 1.25c., the lower prices for prompt shipment, with extras as per the steel bar card, and steel hoops at 1.30c., f.o.b. Pittsburgh.

**Nuts, Bolts and Rivets.**—Makers report that the increased demand for nuts and bolts is being held and more actual orders are being placed by jobbers and consumers than at any time since last summer. It is also stated that the new discounts adopted February 5 are being maintained, and that some consumers are refusing to sell beyond second quarter at the new prices. The demand for rivets is only fair, as the boiler shops are not very busy. We quote button-head structural rivets at \$1.65 to \$1.70 and cone-head boiler rivets at \$1.75 to \$1.80, in carload lots, an advance of \$2 to \$3 a ton over these prices being charged for small lots, depending on the order. Terms are 30 days net, less 2 per cent. for cash in 10 days. The new discounts on nuts and bolts effective from February 5 are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of makers' works:

Coach and lag screws.....	80 and 5% off
Small carriage bolts, cut threads.....	80% off
Small carriage bolts, rolled threads.....	80 and 5% off
Large carriage bolts.....	75 and 5% off
Small machine bolts, cut threads.....	80 and 5% off
Small machine bolts, rolled threads.....	80 and 10% off
Large machine bolts.....	75 and 10% off
Machine bolts, c.p.c. & t nuts, small.....	80% off
Machine bolts, c.p.c. & t nuts, large.....	75 and 5% off
Square h.p. nuts, blanked and tapped.....	\$6.30 off list
Hexagon nuts.....	\$7.20 off list
C.p.c. & r sq. nuts, blanked and tapped.....	\$6.00 off list
Hexagon nuts, 5/8 and larger.....	\$7.20 off list
Hexagon nuts, smaller than 9/16.....	\$7.20 off list
C.p. plain square nuts.....	\$7.80 off list
C.p. plain hexagon nuts.....	\$5.50 off list
Semi-fin. hex. nuts, 5/8 and larger.....	85 and 5% off
Semi-fin. hex. nuts, smaller than 9/16.....	85, 10 & 10% off
Rivets, 7/16 x 6 1/2, smaller and shorter.....	80, 10 & 5% off
Rivets, metallic tinned, bulk.....	80, 10 and 5% off
Rivets, tin plated, bulk.....	80, 10 and 5% off
Rivets, metallic tinned, packages.....	80, 10 and 5% off
Standard cap screws.....	70, 10 and 10% off
Standard set screws.....	75, 10 and 10% off

**Standard Pipe.**—Two of the local mills report actual orders booked in the first half of February about double those in the same period in January. The demand for oil country goods is heavy, drilling in the South and West being unusually active. The inquiry of the Columbus Gas & Fuel Company for 122 miles of 16-in. and 55 miles of 12-in. pipe has been temporarily withdrawn, and in some quarters the opinion prevails that this contemplated natural gas line from the West Virginia fields to Columbus and Springfield, Ohio, will not be built. An inquiry is in the market for 50 miles of 12-in. for building a natural gas line from Mexico to Waco, Texas. Discounts on both iron and steel pipe are being quite firmly held, and some in the trade are looking for an advance in iron pipe in the near future. One leading interest is operating to about 75 per cent. of capacity, but is stocking a good deal of pipe in anticipation of a heavy demand later.

**Boiler Tubes.**—The demand is dragging, as little locomotive building is being done, and the demand for tubes from the boiler shops is also light. Discounts are only fairly well maintained.

## Boston

BOSTON, MASS., February 17, 1914.

**Old Material.**—Two heavy snow storms, one following close upon the other, have had the effect of retarding the development of the market, and prices have not been changed. The dealers are unwilling to venture an opinion as to the general situation—with two feet of snow in the open yards, and traffic held up. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel.....	\$8.75 to \$9.00
Low phosphorus steel.....	13.75 to 14.75
Old steel axles.....	13.25 to 13.75
Old iron axles.....	21.25 to 21.75
Mixed shafting.....	12.75 to 13.00
No. 1 wrought and soft steel.....	9.00 to 9.25
Skeleton (bundled).....	6.00 to 6.50
Wrought-iron pipe.....	8.25 to 8.50
Cotton ties (bundled).....	7.25 to 7.75
No. 2 light.....	3.75 to 4.25
Wrought turnings.....	5.50 to 6.00
Cast borings.....	5.75 to 6.25
Machinery, cast.....	11.25 to 11.50
Malleable.....	8.00 to 8.25
Stove plate.....	7.75 to 8.00
Grate bars.....	6.25 to 6.50
Cast-iron carwheels.....	11.00 to 11.25

## German Export Prices Stiffer

### Prussian State Railroads to Buy Much Material— More Tube and Rod Mills Projected— Hoops Sold to America

BERLIN, February 5, 1914.

Iron and steel manufacturers have been expecting to see the easy state of the money market operate favorably on trade. But money has been cheap and abundant for a full month, and its effects on the iron trade have hardly been felt. Better hopes for the trade are encouraged by the big loans that Prussia is now bringing out—a total of nearly \$148,000,000, for the purpose of expanding the state railroad system, which will involve large orders for iron and steel products of various kinds.

The price situation is irregular. In the Silesian district manufacturers have just decided to advance bars 2.50 marks (60c.), but in the great Rhine-Westphalian district at least two reductions have been reported this week. The Mannesmann Company has at last cut steel tubing about 30 marks (\$7.14) to meet the prices of other producers. The export price of wire rods has been reduced 5 marks (\$1.19) to 95 marks (\$22.61), f.o.b. Antwerp, after it had been held at 100 marks (\$23.80) for a considerable time. On the other hand, export prices of semi-finished steel and certain other products are somewhat higher this week. Slabs are quoted at 82.50 marks (\$19.64) against 82 marks (\$19.52); billets, 90 to 91 marks (\$21.42 to \$21.66) against 90 marks (\$21.42); angles, 106 to 109 marks (\$25.23 to \$25.94) against 106 marks (\$25.23); bands, 115 marks (\$27.37) against 109 marks (\$25.94); rivet bars, 92 to 93 marks (\$21.90 to \$22.13) against 92 marks (\$21.90); and ordinary wire, 120 to 122.50 marks (\$28.56 to \$29.16) against 117.50 marks (\$27.97). These prices are all f.o.b. Antwerp.

The demand for ores has been shrinking visibly for some time, and this is growing more manifest in the Siegerland region. Two pig-iron plants in that region have been shut down this week, but the number of furnaces they operate has not been stated. The Phoenix Company has decided to blow out and abandon its furnaces at Kupferdreh, near Essen; but it will probably rebuild them at one of its other works. A smaller concern has also blown out its furnaces there, apparently with the purpose of quitting business. A number of others have restricted production.

Pig iron is rather quiet. It is reported, however,



that buying has been somewhat more active for several weeks than previously, but the lack of foreign orders is pronounced. It is expected that Russia will soon abolish its pig-iron duty of \$14.30 a ton because of the continued scarcity of iron, and in that case it is believed that a big demand for German iron will spring up. Scrap shows a rather better tendency, with firmer prices.

Semi-finished steel shows no change. It has attracted some attention that the Union did not last week decide upon its prices for this product for the June quarter, as it did for structural shapes. It is now understood that business will be declared open at a meeting to be held early in March, and that no change in prices will be made. The January shipments of structural material were less than 50 per cent. of allotments. A motion was made at last week's meeting to reduce structural shapes 5 marks (\$1.19), but it was voted down. Foreign orders for steel rails still come in, but there is sharp competition from other countries.

Steel bars stand at 96 to 98 marks (\$22.85 to \$23.32) for the home trade, and 90 to 92 marks (\$21.42 to \$21.90) for export; some reports mention even as low an export price as 88 marks (\$20.94). Thin sheets are doing somewhat better, the low prices having attracted buyers. In heavy plates the trade is less satisfactory, the largely increased production still making itself felt as a most disturbing factor. In bands or hoops for the first time American buying has been reported. Belgian competition is keeping prices low.

In wire rods the mills have work to the end of March. Much interest is shown in the forthcoming efforts to renew and expand the syndicate controlling rods, which will expire at the end of June. The doubts about the broadening of the organization still exist, and it will probably be dissolved if wire and wire-nails cannot be included. The difficulty is that several large new producers have appeared to bid for trade. The Hoesch Company has put in a large wire mill, and so has Deutsch-Luxemburg at its St. Ingbert works. Krupp and Phoenix are the two largest producers, and it is doubted whether they will concede to the new establishments such large quotas of the total production as they demand.

The situation of the tube market is growing from bad to worse; and the feeling is that the lowest prices have not yet been reached. It is reported that the Gutehoffnungs-Huette is planning to erect a mill for producing gas and boiler tubes and Deutsch-Luxemburg is also working on a similar plan. Cast-iron pipe is also in a bad position, the independent foundries finding it difficult to compete with those connected with the great mixed establishments that produce their own supply of pig iron.

A Brussels dispatch of to-day reports a further drop of 2.50 francs (48c.) in band iron and heavy plates for the home trade.

## British Trade Slightly Better

### More Blast Furnaces Being Blown In—A Better Tendency in Finished Steel, Especially Beams

(By Cable)

LONDON, ENGLAND, February 18, 1914.

Fuel is easier. German coal is selling here very cheaply, thus relieving the position. Pig-iron consumers are buying with great reserve, yet more furnaces are being put into blast. The demand for semi-finished steel is quiet. A little better tendency is observed in finished steel, especially beams. A fair order for the Pekin Kalgan Railroad is expected to go to America. A good line for South Africa has been taken by the Dominion Steel Corporation. Stocks of pig iron in Connal's stores are 137,936 gross tons, against 137,015 tons two weeks ago. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets. 108 lb., f.o.b. Wales, 13s. 3d. to 13s. 6d. (\$3.22 to \$3.29).

The following prices are per ton of 2240 lb.:

Cleveland pig-iron warrants (Tuesday), 50s. 8d. (\$12.33), against 51s. 9d. (\$12.59) one week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 51s. (\$12.41), against 52s. 3d. (\$12.71) one week ago.

Hematite pig iron, f.o.b. Tees, 62s. 6d. (\$15.21).

Steel sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. (\$21.89).

Steel bars, export, f.o.b. Clyde, £6 (\$29.20).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 17s. 6d. (\$28.59).

Steel ship plates, Scotch, delivered local yards, £6 17s. 6d. (\$33.46).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 (\$43.80).

Steel rails, export, f.o.b. works port, £5 19s. (\$28.95), against £6 2s. 6d. (\$29.81) one week ago.

The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.:

German sheet bars, f.o.b. Antwerp, 81s. (\$19.70).

German 2-in. billets, f.o.b. Antwerp, 76s. (\$18.48).

German basic steel bars, f.o.b. Antwerp, £4 11s. to £4 12s. (\$22.14 to \$22.38), against £4 10s. to £4 11s. (\$21.89 to \$22.14) one week ago.

German joists, f.o.b. Antwerp, £5 2s. to £5 5s. (\$24.82 to \$25.55).

## Buffalo

BUFFALO, N. Y., February 17, 1914.

**Pig Iron.**—Sales for the week show a slight increase, totaling about 25,000 tons, a large portion being malleable. Most of the orders were for comparatively small lots, although a few were for 1000 and 2000 tons. One 2000-ton sale of gray forge is reported at \$12.50, furnace, but this price, it is said, cannot be duplicated. The furnaces are not resorting to urgent measures to promote sales and concession prices are no longer possible, \$13 being the minimum for all foundry grades, so far as can be ascertained. Producers in this district are asking \$1 per ton higher for third quarter and second half deliveries. The tonnage pending is not large. We quote as follows for prompt and first half shipment, f.o.b. furnaces:

No. 1 foundry	.....	\$13.25 to \$13.50
No. 2 X foundry	.....	13.00 to 13.25
No. 2 plain	.....	12.75 to 13.00
No. 3 foundry	.....	12.75 to 13.00
Gray forge	.....	12.75 to 13.00
Malleable	.....	13.00 to 13.50
Basic	.....	13.50 to 14.00
Charcoal	.....	15.50 to 16.50

**Finished Iron and Steel.**—Specifications against first quarter contracts have been coming in in fairly large quantities and new buying, although not quite so brisk, is showing a considerable aggregate of small-lot business for immediate needs, at the recently advanced prices, which are now firmly adhered to by sellers. Concrete reinforcing bars lead in point of activity. The Consolidated Milling Corporation, Buffalo, is completing plans for a mill and elevator, requiring about 400 tons of reinforcing bars. Inquiries for spikes, track supplies and other railroad material are becoming more numerous. An easier Canadian money market has led to a revival of activity across the border, and it is reported that a considerable structural material has recently been placed. The Warren Steel Construction Company, Syracuse, was the low bidder for 1200 tons for the Onondaga Hotel addition, Syracuse. The Onondaga Structural Steel Company, Syracuse, has 400 tons for the tuberculosis hospital for Onondaga County at Hoppers Glen.

**Old Material.**—Demand for heavy melting steel remains good at last week's prices, and there is an increased demand for machine shop turnings, causing the latter to advance \$1 per ton. There is also a continued inquiry for clean cast borings, the price of which is up 25c. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	.....	\$10.50 to \$11.00
Bundled sheet scrap	.....	6.75 to 7.25
No. 1 busheling scrap	.....	9.50 to 10.00
No. 2 busheling scrap	.....	7.00 to 7.50
Low phosphorus steel scrap	.....	15.50 to 16.25
Iron rails	.....	15.00 to 15.50
No. 1 railroad wrought	.....	12.00 to 12.50
No. 1 railroad and machinery cast	.....	12.00 to 12.50
Old steel axles	.....	17.00 to 17.50
Old iron axles	.....	22.50 to 23.00
Old carwheels	.....	12.00 to 12.50
Railroad malleable	.....	10.75 to 11.25
Locomotive grate bars	.....	9.50 to 10.00
Wrought pipe	.....	8.50 to 9.00
Machine shop turnings	.....	6.50 to 7.00
Heavy steel axle turnings	.....	8.25 to 9.00
Clean cast borings	.....	6.75 to 7.25
Stove plate (net ton)	.....	9.75 to 10.00
Bundled tin scrap	.....	12.00

## Metal Market

NEW YORK, February 18, 1914.

### The Week's Prices

Cents Per Pound for Early Delivery

Copper, New York		Tin.		Lead		Spelter	
Feb.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
13.....	15.00	14.70	40.40	4.00	3.87½	5.45	5.30
14.....	15.00	14.70	40.40	4.00	3.87½	5.40	5.25
16.....	15.00	14.62½	40.25	4.00	3.87½	5.40	5.25
17.....	15.00	14.62½	39.75	4.00	3.87½	5.40	5.25
18.....	15.00	14.62½	39.25	4.00	3.87½	5.40	5.25

Copper is quiet and prices are easier. Tin is lower and dull. A fair demand for lead has been satisfied at a lower price. Spelter is not active and is off a few points. Antimony is unchanged.

### New York

**Copper.**—In the latter part of the last week there was some moderate buying of electrolytic, but since then demand has abated and the market is easier at 14.62½c. to 14.70c., although only small lots have been offered at the lower figure. The demand for brass and copper products, which showed some improvement two or three weeks ago, has eased off again and some of the mills in the Naugatuck Valley are running short hours again. Ordinary brands of Lake are nominal at around 15c. but are not easy to secure because of the upset condition in Michigan. The asking price of Calumet & Hecla was advanced in the latter part of last week to 15.25c. from 15.12½c. and some sales are reported at the new price. Exports this month total 21,434 tons and their excellent volume, now so long sustained, is a cause of interest on the part of the trade. European advices say that the pace at which copper has been taken abroad cannot be kept up much longer. Quotations in London to-day are £65 2s. 6d. for spot and £65 12s. 6d. for futures.

**Tin.**—The market has been dull since the last report with more sellers than buyers and considerable cutting of prices in the effort to induce business. Buyers, however, have lacked confidence and not responded to the offers made. Tin is quoted at 39.25c. to-day as against 40.40c. last Friday. The cause of the steady decline is attributed to the fact that the speculators who bought to force the market up finally ceased their bull operations. While the quotations were at their higher level many consumers bought and now feel somewhat aggrieved in view of the decline. In some cases the cuts for future delivery were severe. At the present time supplies are limited, but this will soon be remedied by arrivals. There has arrived this month 1405 tons and there is afloat 3640 tons. The London quotations to-day are £179 for spot and £180 10s. for futures.

**Lead.**—Late on February 11, the American Smelting & Refining Company reduced its New York price to 4c. At the time, the market was easier but the trade never expected a drop of 3¢ per ton and has been since speculating as to the reason. At the 4c. price a fair demand sprang up and fair sales were made, although some of the independent producers temporarily withdrew from the market rather than meet the new price. Since Saturday consumers' needs seem to have been satisfied and dullness has prevailed. The St. Louis price is 3.87½c.

**Spelter.**—Quotations range from 5.40c. to 5.50c., New York, and 5.25c. to 5.35c., St. Louis. Buying has not been active although there has been a fair amount of inquiry in the past few days.

**Antimony.**—This metal has shared the general dullness incidental to the present market and prices are unchanged at 6c. to 6.37½c. for Chinese and Hungarian brands, 7c. to 7.12½c. for Hallet's and 7.25c. to 7.37½c. for Cookson's.

**Old Metals.**—There is a fair demand. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible.....	14.25 to 14.50
Copper, heavy and wire.....	13.75 to 14.00
Copper, light and bottoms.....	12.75 to 13.00
Brass, heavy.....	9.00 to 9.25
Brass, light.....	7.75 to 8.00
Heavy machine composition.....	12.25 to 12.50
Clean brass turnings.....	8.75 to 9.00
Composition turnings.....	11.50 to 11.75
Lead, heavy.....	3.75
Lead, tea.....	3.50
Zinc, scrap.....	4.25

## Chicago

FEBRUARY 17.—Except for fluctuations in the price of tin, which brought little net change at the end of the week, the metal market has been quiet and featureless. We quote as follows: Casting copper, 15c.; Lake copper, 15.25c. to 15.50c., for prompt shipment; small lots, ¼c. to ½c. higher; pig tin, carloads, 41.25c.; small lots, 43.25c.; lead, desilverized, 4.10c., and corroding, 4.35c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.35c.; Cookson's antimony, 9.50c.; other grades, 8c.; sheet zinc, \$7.25, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 12c.; copper bottoms, 11c.; copper clips, 11.50c.; red brass, 11.25c.; yellow brass, 8.50c.; lead pipe, 3.75c.; zinc, 3.75c.; pewter, No. 1, 25c.; tin-foil, 30c.; block tin pipe, 33c.

## St. Louis

FEBRUARY 16.—The metal market has been somewhat irregular, with lead decidedly off as a result of the leading producer's cut in prices last Wednesday, while spelter is higher. Lead closed to-day at 3.90c.; spelter, 5.32½c. to 5.35c.; tin, 40.70c. to 41.10c.; Lake copper, 15.25c. to 15.35c.; electrolytic copper, 15.22½c.; Cookson's antimony, 7.60c. In the Joplin ore market the past week the highest price paid for zinc blende, on a basis of \$43 per ton of 60 per cent. was \$46. The range ran down to \$41. The storms cut down production during the week and reduced the supply available. Calamine sold on a basis of \$20 to \$22 for 40 per cent., with the top price \$27. Lead ore was unchanged at \$50 for 80 per cent. We quote miscellaneous scrap metals as follows: Light brass, 5c.; heavy yellow brass, 7.50c.; heavy red brass and light copper, 9c.; heavy copper and copper wire, 9.50c.; zinc, 2.75c.; lead, 3c.; pewter, 22c.; tin-foil, 28c.; tea lead, 2.75c.

## Iron and Industrial Stocks

NEW YORK, February 18, 1914.

Values of industrial stocks do not seem to have been unfavorably affected by the announcement of the Interstate Commerce Commission that the proposed advance of 5 per cent. in Eastern freight rates has been suspended from March 15 to September 12. In fact, this has been less of a disturbing influence in the stock market than might have been expected. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	12½-13¾	Nat. En. & St., com.	12½-13¾
Allis-Chal., pref.	47½-48½	Pittsburgh Stl., pref.	92¾
Am. Can., com.	30¾-31¾	Pressed Stl., com.	43¾-46
Am. Can., pref.	92¾-93¾	Pressed Stl., pref.	103¼
Am. Car & Fdy., com.	51½-52¾	Ry. Spring, com.	31¾-32¾
Am. Loco., com.	34½-36¼	Railway Spg., pref.	101
Am. Loco., pref.	101-101¾	Republic, com.	25½-26½
Am. St'l Fdries.	36-37½	Republic, pref.	89-89½
Bald. Loco., com.	44¼-45¼	Rumely Co., com.	13-15¼
Bald. Loco., pref.	105¾	Rumely Co., pref.	33-34¾
Beth. Steel, com.	36-37½	Sloss, com.	33½-34½
Beth. Steel, pref.	76-77½	Pipe, pref.	48¾-49
Case (J. I.), pref.	90-93½	U. S. Steel, com.	65¾-67
Colorado Fuel...	32½-33½	U. S. Steel, pref.	109¼-110¾
Deere & Co., pref.	97½-97¾	West'gh's Elec.	70-70¾
General Electric	147¼-148½	Chic. Pneu. Tool	57-60
Gt. N. Ore Cert.	36¼-38	Cambria Steel...	50-50¾
Int. Harv., com.	109½-110	Lake Sup. Corp.	22½-23
Int. Harv., pref.	117½	Pa. Steel, pref.	65¼-65½
Int. Harv. Corp.	109½	Cruc. Steel, com.	16-16¼
Int. Harv. Corp., pref.	117½	Cruc. Steel, pref.	93¼-94
Int. Pump, com.	8	Harb.-Wk. Ref., com.	48
Int. Pump, pref.	26¼	La Belle Iron, com.	44½
Lack. Steel...	38½-38¾		

## Dividends Declared

The General Electric Company, regular quarterly, 2 per cent., payable April 15.

The Pittsburgh Steel Company, regular quarterly, 1½ per cent. on the preferred stock, payable March 2.

The Harbison-Walker Refractories Company, regular quarterly, ½ of 1 per cent. on the common stock, payable March 1.



## Personal

J. E. G. Coxwell, Eastern representative for the Columbia Steel & Shafting Company, Pittsburgh, Pa., sailed for Europe Tuesday, February 17, for a short vacation, accompanied by Mrs. Coxwell.

Col. H. D. Savage, who has been connected with the Ashland Fire Brick Company, Ashland, Ky., for 17 years, has severed his connection, to take effect March 1, and will be connected with the American Arch Company, 30 Church street, New York.

A. B. Olds, day superintendent of the Slatington Rolling Mills, Slatington, Pa., has resigned, and has been succeeded by Earl Lower. This plant confines its product almost entirely to specification wrought-iron bars.

H. C. Krider has engaged as salesman with Charles Dreifus & Co., Oliver Building, Pittsburgh, dealers in iron and steel scrap.

O. Wilbur Hocking has been elected secretary of the Whitaker-Glessner Company, Wheeling, W. Va. Other officers were re-elected at the recent annual meeting.

Thomas V. Brennan, formerly in the office of the Whitney-Kemmerer Company, at Pittsburgh, Pa., has been transferred to the new office at Norton, Va.

Walter E. Housman and Hans E. Seidl have formed a partnership as consulting engineers under the firm name of Seidl & Housman. They have opened an office at 901 Swetland Building, Cleveland, Ohio, and will devote their attention principally to public utility work and mechanical and electrical engineering. Mr. Housman was for many years a power expert with the United States Steel Corporation, while Mr. Seidl has been engaged in public utility work as consulting engineer.

Harold Almert, for the past five years manager of the department of examinations and reports of H. M. Byllesby & Co., has severed his connection with that firm to engage in consulting engineering practice on his own account with offices in the Rookery, Chicago. Mr. Almert is just completing his twentieth year of active work in the organization, financing, design, construction, operation and management of public utilities. As assistants he will have associated with him a staff of specialists in mechanical, electrical, gas and hydraulic engineering, appraisals, rate investigations, accounting and efficiency work.

John W. Gocher, member of the American Society of Mechanical Engineers and the American Iron and Steel Institute, who was for a number of years chief engineer and later consulting engineer for the Cambria Steel Company, has opened offices for the practice of his profession in the First National Bank Building, Johnstown, Pa.

S. M. Marshall has resigned as chief engineer of the Cambria Steel Company, Johnstown, Pa., effective March 1, to become manager of A. J. Haws & Sons, Ltd., manufacturer of silica, clay and magnesite brick, in the same city.

A. O. Kuehmsted, vice-president and sales manager of the Gregory Electric Company, has been elected president of the Electrical Credit Association of Chicago. This is a strictly mutual organization, comprising most of the manufacturers and jobbers of electrical machinery and supplies in the territory from Pittsburgh to Denver and from Lake Superior to the Gulf of Mexico.

J. Drew Allen, who for a number of years has been connected with the Pennsylvania Steel Company, latterly with the Chicago sales office, has been appointed Northern Pacific coast representative for the Taylor-Wharton Iron & Steel Company, with headquarters at Portland. This company has developed an important trade in that territory for street railroad equipment and manganese steel.

Victor E. Bergstrom, who for the past five years has been the New York representative of Luria Bros. & Co., has organized the firm of V. E. Bergstrom & Co., dealers in iron and steel scrap, with offices in the Hudson Terminal Building, New York City.

J. E. Bachelder, for seven years manager of the steam pump department of Fairbanks, Morse & Co., has resigned, effective March 1, to become vice-president and general manager of the Temple Pump Company, Chicago, manufacturing power pumps, gas engines and allied products.

John C. Fruit, who has been associated with the Chicago Steel Products Company, Chicago, has severed that connection and is now with Gaut & Chase, 759 Peoples Gas Building, architects and designers for industrial plants.

H. E. Zellers, formerly superintendent of the coke plant of the Republic Iron & Steel Company at Merrittstown, Pa., has been made efficiency engineer of the by-product coke plant now being completed by the company at Youngstown, Ohio.

W. P. Snyder, president Shenango Furnace Company, Pittsburgh, has gone to Palm Beach, Fla., for an extended stay.

Charles H. Burgess, general superintendent of mills of the Western division of the Republic Iron & Steel Company, has been appointed general manager of the St. Louis Screw Company. Under his direction the latter company will erect a rolling mill and a bolt and screw plant.

David R. James, secretary and treasurer of the Empire Rolling Mill Company, Cleveland, Ohio, has been elected president of the State Banking & Trust Company in that city.

John H. Schumann, Jr., president Moller & Schumann Company, has been elected to the directorate of the Citizens Trust Company, Brooklyn, N. Y., to fill the vacancy caused by the death of his father in December.

Joseph T. Ryerson, treasurer of Joseph T. Ryerson & Son, Chicago, sailed February 11 from New York to spend about two weeks in Bermuda.

John A. Sutton, vice-president Crucible Steel Company of America, Pittsburgh, has sailed for Europe.

James McLean, of Phelps, Dodge & Co., has been elected to the executive committee of the American Can Company to succeed William T. Graham, who retired from the presidency of the corporation about a year ago.

## Obituary

HENRY BRINTON, president H. Brinton Company, Philadelphia, manufacturer of textile machinery, died January 30, at his home at Bala, after a brief illness of heart trouble. He was born in 1848 at Christiana, Lancaster County, Pa., and early in his career as a machinist spent two and one-half years with Bement, Miles & Co., Philadelphia, and then later in Colt's Armory, Hartford, Conn., before he became identified with the knitting machinery industry. In 1888 he started as a manufacturer in a partnership styled Brinton, Denney & Co., which five years later became H. Brinton & Co., and in 1906 was incorporated with the present name. Mr. Brinton's achievements lay chiefly in improving and commercializing automatic cylinder knitting machinery.

HARRY E. BEECHER, contracting manager in Pittsburgh of the American Bridge Company of New York, died at his home in Youngstown, Ohio, February 6, from pneumonia. He was born in Columbiana, Ohio, and spent most of his commercial life in the bridge business, originally with the Morse Bridge Company in Youngstown, then with the Smith Bridge Company, its successor, and later with the Toledo Bridge Company, Toledo, Ohio. When the latter company became a constituent of the American Bridge Company, in 1901, Mr. Beecher went to the Pittsburgh office, but continued to reside in Youngstown. He leaves a widow and a daughter.

T. C. OCTIGAN, founder and proprietor of the Octigan Drop Forge Company, Chicago, died suddenly February 11, following an acute attack of nephritis. He was born at Oldham, England, March 9, 1851, came to this country at the age of 16, followed his trade as a machinist blacksmith in New England, and located in

Chicago about 1874. Twenty years ago he organized the business in which he was actively engaged at the time of his death. He leaves two sons, J. Frank and Thomas P. Octigan, who will continue the business. Mr. Octigan was the inventor of the rubber pad horseshoe.

JOSEPH S. G. SWEAT, East Billerica, Mass., prominent as a brass founder, died recently, aged 70 years. A native of New Hampshire, he learned the trade of brass founder at Lowell, Mass. After serving through the civil war he was employed in the foundry of the Charlestown navy yard, and later established a foundry of his own on Sudbury street, Boston, and afterward moving the business to South Boston, as the head of Sweat & Chase.

RAYMOND G. SYKES, president Sykes Metal Lath & Roofing Company, Chicago, recently died in that city, aged 65 years. Many years ago he established a metal roofing plant at Niles, Ohio, removing to Chicago in 1897 to engage in the same branch of business.

CHARLES HOAR, formerly assistant purchasing agent of the Sharon Steel Hoop Company, Sharon, Pa., died at his home in Lancaster, Pa., February 2, aged 28 years. He was a graduate of Blair Academy and Washington and Jefferson College.

### News of the Panama-Pacific Exposition

Charles C. Moore, president of the Panama-Pacific International Exposition, has prepared a statement from which the following is taken:

"The progress of the physical side of the exposition work enables me to repeat with assurance the promise originally made two years ago when I said that the Panama-Pacific International Exposition would be ready when its gates opened on February 20, 1915. All construction work is fully up to schedule, and this schedule calls for the completion of the exhibit palaces by July 1, 1914.

"There will be approximately 60,000 exhibits from all parts of the world installed in the main exhibit palaces. The allotment of space will shortly be taken up and the installation of exhibits will begin about July 1, thus giving exhibitors nearly 8 months to get ready. We have had over 7000 applications for concessions, and those that have been given space are on the highest plane as regards novelty, interest and attraction. Some 206 national and international congresses have already voted to meet in San Francisco in 1915, and it is probable that the number of organized bodies which will assemble in 1915 in San Francisco will be fully 500."

### To Sell Dominion Wabana Ore

The Dominion Iron & Steel Company will offer about 150,000 tons of its Wabana iron ore in the Eastern market for shipment this year and Naylor & Co., New York, have been appointed selling agents. This is the first time the company has put any of its ore on the market, the Wabana ores heretofore sold in this country and Germany being those of the Nova Scotia Steel & Iron Company. The two companies are mining the extensive Belle Island deposits which, as is well known, extend some distance under the sea at Conception Bay, and mining by the Nova Scotia Steel & Iron Company is now carried on at a distance of two miles from shore. The Dominion Company's ore which Naylor & Co. will offer, runs from 49 to 52 per cent. metallic iron, 11.5 to 16 per cent. silica, 0.01 to 0.05 sulphur, 2 to 3 per cent. lime, 0.65 to 0.90 phosphorus, and about 2 per cent. moisture. The Wabana ores sold in eastern Pennsylvania in the past year were held at 6% to 7 cents per unit.

Motion pictures of pipe manufacture are to be shown publicly at the Stuyvesant high school, East Fifteenth street near Second avenue, New York, Tuesday evening, February 24. The pictures are those developed by the National Tube Company.

The Gulf Compress Company, C. C. Hanson, receiver, Memphis, Tenn., states it is in the market for elevator machinery for unloading, elevating, weighing, cleaning, clipping and sacking oats by electric power.

### Pittsburgh and Valleys Business Notes

The Darlington Steel Casting Company, just organized, has taken over the plant formerly operated by the United States Foundry & Furnace Company at Darlington, Pa., and will operate it in the manufacture of small, high-grade steel castings. George P. Steel, formerly of Pittsburgh, is president and general manager; Harry W. Reeves, Beaver Falls, vice-president; Alex P. Dysart, Pittsburgh, secretary and treasurer.

The partnership heretofore existing between B. F. Hoffacker, W. H. Sauerwein and Martin Gannon, as the Pittsburgh Diamond Drill Company, Pittsburgh, has been dissolved and the business will hereafter be carried on by Martin Gannon, with headquarters at Connellsville, Pa.

The Republic Iron & Steel Company has completed the building of a new hospital at its Brown-Bonnell works, Youngstown, Ohio. It contains a hospital ward, X-ray room, waiting room, shower baths, lavatory and other departments.

No. 3 blast furnace of the Carnegie Steel Company at Farrell, Pa., was blown in last week.

At the annual meeting of stockholders of the Niles Car & Mfg. Company, Niles, Ohio, officers and directors were elected as follows: F. C. Robbins, president and general manager; T. E. Thomas, vice-president; Charles E. Ross, secretary and treasurer. Directors: F. C. Robbins, T. E. Thomas, A. F. Harris, George D. Kirkham, A. G. Webb, B. F. Pew, L. H. Young, J. A. Hanna and Charles E. Ross.

At the annual meeting of the Engineers' Society of Western Pennsylvania, Pittsburgh, A. R. Raymer, assistant chief engineer, Pittsburgh & Lake Erie Railroad, was elected president; A. Stucki, consulting engineer, first vice-president; Samuel E. Duff, consulting engineer, second vice-president; E. K. Hiles, re-elected secretary; A. E. Frost, registrar at the University of Pittsburgh, treasurer. George H. Neilson, Braeburn Steel Company, and Fred Crabtree, professor of metallurgy, Carnegie Institute of Technology, were elected directors.

The mechanical section of the Engineers' Society of Western Pennsylvania has elected officers as follows: John A. Hunter, chairman; Stewart Marshall, vice-chairman. Directors: T. D. Lynch, J. A. McCulloch and Albert Kingsbury, consulting engineer. At the same meeting the retiring chairman, George H. Neilson, spoke on "Crucible Steel."

The United Engineering & Foundry Company, Pittsburgh, has received an order for a 300-ton forging press to be installed in the Vandergrift works of the American Sheet & Tin Plate Company.

James Field, of Cincinnati, Ohio, is promoting the Mountain State Rail & Spike Mill, to be located in Bluefield, W. Va., at a cost of about \$200,000.

The East End Ice & Storage Company, Wheeling, W. Va., has been incorporated with \$50,000 capital stock by Joseph Breiding, W. R. Stoops, George L. Zoeckler and others.

The Trimble & Johnson Company, Moundsville, W. Va., will build a machine and automobile repair shop. T. S. Riggs is president.

The Pittsburgh Steel Products Company, Pittsburgh, has opened an office in room 1903, Railway Exchange Building, St. Louis, in charge of A. F. McCoolle, manager of sales, and C. F. Palmer, supervisor. The Chicago office of the company is located at 744 First National Bank Building, with C. R. King in charge.

The Driggs-Seabury Ordnance Corporation, Sharon, Pa., has signed a contract to manufacture for the Twombly Car Corporation, New York City, 3000 Twombly motor cars. This car will sell at \$395, and the sales end of the business will be handled by the Twombly Car Corporation.

The Chicago Bridge & Iron Company, Greenville, Pa., will make large additions to its plant and will erect new buildings, which will nearly double the present capacity. The company is a fabricator of structural steel and has a large number of orders ahead.

The Central Telephone Company will erect a nine-



story building on Seventh avenue, Pittsburgh. The structure will require 3000 to 4000 tons of steel, and will be equipped with power, heating and refrigerating apparatus. The Bartley-Kennedy Company, heating engineer, 224 Third avenue, Pittsburgh, is taking estimates on equipment and appliances, including two 250-hp. boilers, stokers, air compressors, pumps, gas engines, etc.

The Greenville Metal Products Company, Greenville, Pa., maker of metal specialties, is remodeling and enlarging its plant and is installing new equipment for the rebuilding of steel cars. The company has a contract for rebuilding 30 cars a week for the Bessemer & Lake Erie Railroad and has taken an order to rebuild 1000 cars for the Erie Railroad.

Atlantic furnace of the Republic Iron & Steel Company at New Castle, Pa., which has been idle since last October, has been almost entirely remodeled and enlarged. The company expects to put the stack in operation shortly.

Soho blast furnace of the Jones & Laughlin Steel Company at Pittsburgh, which has been idle for several months, is being rebuilt and enlarged. The stack is being raised, new blowing equipment installed and the capacity will be increased from 300 to about 400 tons per day. It is expected to resume blast early in March.

Henry F. Gilg, 924 Farmers' Bank Building, Pittsburgh, has been put in charge of sales of old-fashioned wrought-iron sheets, made from puddled pig iron by the Paden Iron & Steel Company, Paden City, W. Va., of which Robert A. Carter is president. The rolling of puddled iron sheets was started this week.

Efforts are being made to effect an agreement with the creditors of the National Sanitary Mfg. Company, Salem, Ohio, so that the company's plant which was shut down six weeks ago can be again placed in operation. The plan proposed includes the securing of \$50,000 working capital and the consent of the largest creditors to have their payments deferred for two years. Before the plant was shut down the company was doing a profitable business and it has a good volume of orders on its books.

The plant of the Standard Steel Tank & Mfg. Company, Girard, Ohio, has been sold at receiver's sale to R. H. Benham. It is understood that it will be continued in operation.

The Acme Nail & Supply Company, Cleveland, Ohio, has been organized as a partnership composed of John O'Brien, P. J. Plunkett and C. J. Robinson to handle coated nails and factory supplies. The company has established a place of business at 422-424 Frankfort avenue. It has acquired the good will and purchased considerable of the stock of the Lake Erie Machinery & Supply Company's business. The new concern, however, will not handle machinery.

On February 1 the Carnegie Steel Company was operating 35 of its 58 blast furnaces. On February 10 stack H at its Edgar Thomson plant was blown in and on February 17 No. 3 stack at its Ohio works, Youngstown, was started, so that the company is now operating 37.

The Farrell works of the American Sheet & Tin Plate Company at Farrell, Pa., was put in full operation on Monday, February 16, the first time it has run full for several months.

J. P. Dillon, Titusville, Pa., has purchased the plant of the Riverside Gas Engine Company at Titusville from the receiver. It is stated that he will remodel the plant and put it in operation as soon as repairs and improvements have been finished.

The Cambria Steel Company, Johnstown, Pa., reports operating conditions more active than at any time since last summer. It is running seven of its eight blast furnaces, having one stack out for relining and repairs, which will be started as soon as it is ready. It is also operating 27 out of 28 open-hearth furnaces, and its structural and plate mills and wire department are running practically full.

### The Future of Imataca Iron Ore

The bondholders of the Canadian Venezuelan Ore Company, Montreal, Canada, whose Imataca iron mine in Venezuela has closed down after shipments to the United States of about 60,000 tons, have sent an expert to the property to go over it with a view to recommending plans for the future. Due to the default on interest on \$1,000,000 bonds January 1 the bondholders come into possession of the mine within a few weeks. The first shipments of ore were from a pocket which proved to have a considerably higher grade ore than has been found since its exhaustion. It is now to be determined what grade of ore can be regularly shipped and whether it can be profitably mined for the eastern Pennsylvania market.

### Reduction to Tonnage Men

At the Upper and Lower Union Works of the Carnegie Steel Company at Youngstown, Ohio, rates paid to rollers and other workers on a tonnage basis have been reduced. At both plants new equipment has very materially increased the output, and in order to adjust wages to an equable basis the new schedule was prepared. Mechanics, day laborers and other employees were not reduced. At the Upper and Lower Union Works in 1913 the output exceeded that for any year in the history of the plants, and in October it was the largest for a single month in the year.

The Sandusky Foundry & Machine Company, Sandusky, Ohio, states that it is now the manufacturer of the largest seamless brass and bronze tubing in the world, sizes running from 6 in. in diameter, with 3/16-in. walls, up to 22 in. in diameter with 3/16 to 3 in. walls. The company further states that, as far as it knows, it is the only concern in the world able to make seamless tubes commercially of genuine bronze. The advantage of its method of manufacture is that it is able to furnish material in any of the range of sizes specified on short order.

Investigations of an English firm, made with a view to exporting twisted bars for concrete reinforcing to the United States, showed that it was impossible at existing prices to establish trade in this country. This conclusion was based on the following current prices per ton: Continental steel bars, \$22.14 f.o.b. Antwerp, cost of twisting additional; British steel bars, \$29.19 (base sizes) f.o.b., with cost of twisting additional.

The Trumbull Steel Company, Warren, Ohio, has increased its capital stock from \$1,250,000 to \$2,500,000 to provide for enlargements. Plans have not yet been definitely decided, but it is probable that the finishing capacity will be doubled by increasing the number of hot mills to 24, part of which will be tin mills and part sheet mills.

Daniel J. Driscoll, Reading, Pa., reported to be connected with the Delaware Seamless Tube Company, Harrisburg, Pa., purchased the plant of the old Diamond State Steel Works, Wilmington, Del., February 10, for \$208,000. The property was disposed of at trustees' sale, which will have to be confirmed by the courts.

The Michigan Steel Castings Company, Detroit, Mich., has re-elected officers as follows: R. F. Flintermann, president; A. J. S. Blackwood, vice-president; E. B. Caulkins, secretary; H. B. Hoyt, treasurer. In spite of labor troubles a satisfactory year was reported.

The Boston branch of the National Metal Trades Association is about to undertake in its secretary's office, 141 Milk street, to maintain a complete catalogue file for the use of its members. Catalogues are therefore solicited from manufacturers.

## PIG-IRON PRODUCTION IN 1913

A Total of 30,966,301 Tons or 1,239,364 Tons More Than in 1912

(See Table on Opposite Page)

The Bureau of Statistics of the American Iron and Steel Institute has received from the manufacturers statistics of the production of all kinds of pig iron in the United States in the calendar year 1913. The total production of all kinds of pig iron in 1913 amounted to 30,966,301 gross tons, against 29,726,937 tons in 1912, an increase of 1,239,364 tons, or over 4.16 per cent. The production in 1913 was the largest in any calendar year in our history. Combining the output in the first six months of 1913 with the output in the last six months of 1912, however, a total is reached for the twelve consecutive months of 32,143,265 tons, or 1,176,964 tons more than in the calendar year 1913. The following table gives the production of pig iron in half-yearly periods from 1910 to 1913, in gross tons, including several thousand tons of ferrophosphorus, ferro-titanium, ferrovanadium, and other alloys:

	1910	1911	1912	1913
First half....	14,978,738	11,666,996	14,072,274	16,488,602
Second half..	12,324,829	11,982,551	15,654,663	14,477,699
Total .....	27,303,567	23,649,547	29,726,937	30,966,301

The production in the second half of 1913 shows a decrease of 2,010,903 tons, or almost 12.2 per cent., as compared with the first half.

### CLASSIFIED PRODUCTION

The production of Bessemer and low-phosphorus pig iron in 1913 was 11,593,385 tons, against 11,664,015 tons in 1912, a decrease of 70,630 tons, or about 0.6 per cent. In the second half of 1913 the production of Bessemer and low-phosphorus pig iron was 5,307,419 tons, as compared with 6,285,966 tons in the first half. The production of low-phosphorus pig iron alone in 1913 was a maximum and amounted to 316,818 tons, as compared with 282,359 tons in 1912.

The production of basic pig iron in 1913, including a small tonnage of charcoal pig iron of basic quality, amounted to 12,537,746 tons, against 11,417,886 tons in 1912, an increase of 1,119,860 tons, or over 9.8 per cent. In the second half of 1913 the production was 6,027,735 tons, against 6,510,011 tons in the first half, a decrease of 482,276 tons. The production in 1913 was much the largest in our history; the year of next largest production was 1912.

The production of charcoal pig iron in 1913 amounted to 339,981 tons, against 347,025 tons in 1912, a decrease of 7044 tons. A small quantity of pig iron made with charcoal and electricity is included in the figures for both years. In the first half of 1913 the production of charcoal pig iron amounted to 176,182 tons and in the second half it amounted to 163,799 tons. No pig iron was made in 1912 or 1913 with mixed charcoal and coke as fuel.

The production of spiegeleisen and ferromanganese in 1913 amounted to 229,834 tons, against 221,724 tons in 1912, an increase of 8110 tons. The production of ferromanganese alone in 1913 amounted to 119,496 tons, against 125,378 tons in 1912. Of spiegeleisen alone the production amounted to 110,338 tons in 1913, against 96,346 tons in 1912. In addition to the above, 3332 tons of ferrophosphorus were produced in 1913, against 6697 tons in 1912.

The production of bituminous coal and coke pig iron in 1913 reached a maximum of 30,348,973 tons as compared with 29,132,733 tons in 1912, an in-

crease of 1,216,240 tons, or about 4.2 per cent. In the first half of 1913 the production was 16,107,845 tons, and in the second half 14,241,128 tons.

The production of mixed anthracite and coke pig iron in 1913 amounted to 254,901 tons, as compared with 236,467 tons in 1912, an increase of 18,444 tons. In the first half of 1913 the production amounted to 193,084 tons, and in the second half it amounted to 61,817 tons. The production of pig iron with anthracite coal alone in 1913 amounted to 22,446 tons, as compared with 10,712 tons in 1912.

### FURNACES IN BLAST AND BUILDING

The whole number of furnaces in blast on December 31, 1913, was 205, against 304 on June 30, 1913, and 313 on December 31, 1912. The number of furnaces idle on December 31, 1913, including furnaces being rebuilt, was 257, against 160 on June 30, 1913, and 153 on December 31, 1912.

The number of furnaces actually in blast for a part or the whole of the last six months of 1913 was 330, against 348 in the first half of the year. In the last half of 1912 337 furnaces were active, against 302 in the first half.

On December 31, 1913, there were three entirely new furnaces in course of construction, all of which will use coke fuel, as follows: Pennsylvania, 1, and Minnesota, 2. They will have a total annual capacity of 505,000 gross tons of pig iron. In addition eight furnaces were being rebuilt on that date.

In 1913 there were five entirely new furnaces built, four coke and one charcoal, with an annual capacity of 596,000 gross tons, as follows: Pennsylvania, 2; Virginia, 1; Ohio, 1, and Mississippi, 1 (charcoal). In addition one charcoal furnace in Georgia, with an annual capacity of 13,500 tons, was revived.

During 1913 there were 10 blast furnaces abandoned or dismantled, with a total annual capacity of 316,000 gross tons, as follows: New York, 1; Pennsylvania, 4; Virginia, 2; Tennessee, 1; Ohio, 1, and Michigan, 1. When last in blast two furnaces, with an annual capacity of 29,000 tons, used charcoal, and eight furnaces, with an annual capacity of 287,000 tons, used mineral fuel. Some of these furnaces had been idle for many years.

### The Gronwall Electric Furnace in America

John A. Crowley, president John A. Crowley Company, 120 Liberty street, New York City, who returned from England February 9, has concluded negotiations for the exclusive representation of the Gronwall electric steel-making furnace for this country. This furnace is perhaps better known in this country in connection with the ore smelting furnace of the same name used in smelting Swedish ores, but the steel melting and refining furnace, it appears, is now being operated in several of the English mills and is being introduced in the Sheffield section.

The Gronwall furnace is adapted to melting cold charges or refining from the molten metal. It is a two-phase arc furnace with a neutral return fixed in the bottom of the furnace under the lining. The furnace is of the tilting type, allowing the withdrawing of the slag at any stage of the refining process and the introduction of another slag, and the withdrawing of any part or all of the charge at any time.

The John A. Crowley Company is to install one of these furnaces as soon as a suitable location can be secured. The results of operation will be awaited with great interest, especially as the aim is to produce the higher grades of alloy steels for commercial purposes, although production is not to be entirely limited to this class of material, but is to include high carbon tool and spring steels. Considerable attention will also be given, it is understood, to producing a high-grade steel for castings.



# THE PRODUCTION OF PIG IRON IN THE UNITED STATES IN 1913.

Statistics Collected from the Manufacturers by the Bureau of Statistics of The American Iron and Steel Institute, all in Gross Tons of 2,240 pounds.

Production in the First Half of 1913, 16,488,602 Gross Tons; Second Half of 1913, 14,477,699 Tons; Whole of 1913, 30,966,301 Tons.

## Total Production of All Kinds of Pig Iron.

### TOTAL PRODUCTION OF PIG IRON BY STATES.

States, Gross tons.	Blast Furnaces.				Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.)		
	In blast June 30, 1913.	December 31, 1913.			First half of 1913.	Second half of 1913.	Total for 1913.
		In.	Out.	Total.			
Massachusetts	1	1	1	2	8,581	4,229	12,810
Connecticut	2	1	2	3			
New York	20	12	16	28	1,193,450	994,170	2,187,620
New Jersey	2	2	5	7			
Pennsylvania	117	78	83	161	6,885,058	6,069,882	12,954,940
Maryland	3	1	4	5	152,002	137,957	289,959
Virginia	9	8	16	24	192,530	149,285	341,815
Georgia	0	0	4	4			
Texas	0	0	4	4			
Alabama	23	23	26	49	1,078,173	979,738	2,057,911
West Virginia	3	1	3	4			
Kentucky	2	1	7	8	165,000	150,731	315,731
Mississippi	0	0	1	1			
Tennessee	8	4	14	18	189,019	91,522	280,541
Ohio	62	40	35	75	3,660,473	3,469,052	7,129,525
Illinois	23	11	15	26	1,653,017	1,274,960	2,927,977
Indiana	10	5	5	10	894,743	881,140	1,775,883
Michigan	9	10	5	15			
Wisconsin	5	4	3	7	222,167	145,159	367,326
Minnesota	1	1	0	1			
Missouri	1	1	1	2			
Colorado	3	1	5	6			
Oregon	0	0	1	1	194,389	129,874	324,263
Washington	0	0	1	1			
California	0	0	0	0			
Total	304	205	257	462	16,488,602	14,477,699	30,966,301

### PRODUCTION OF BITUMINOUS COAL AND COKE PIG IRON.

New York	20	12	11	23	1,193,450	994,170	2,187,620
New Jersey	2	2	5	7			
Pennsylvania	105	70	65	135	6,678,179	5,994,735	12,672,914
Maryland	3	1	3	4	152,002	137,957	289,959
Virginia	8	7	13	20			
Georgia	0	0	2	2	191,203	147,372	338,575
Texas	0	0	3	3			
Alabama	21	21	24	45	1,061,640	963,821	2,025,461
West Virginia	3	1	3	4	165,000	150,728	315,728
Kentucky	2	1	6	7	188,574	89,632	278,206
Tennessee	7	4	13	17	3,659,723	3,467,801	7,127,524
Ohio	62	40	33	73	1,653,017	1,274,960	2,927,977
Illinois	23	11	15	26			
Indiana	10	5	5	10	945,277	862,383	1,807,660
Michigan	2	3	0	3			
Wisconsin	4	3	3	6			
Minnesota	1	1	0	1			
Missouri	0	0	1	1			
Colorado	3	1	5	6	219,780	157,569	377,349
Washington	0	0	1	1			
California	0	0	0	0			
Total	276	183	211	394	*16,107,845	*14,241,128	*30,348,973

\*Include small quantities of pig iron and ferro-alloys made with coke and electricity, etc.

### ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

New York	0	0	3	3			
Pennsylvania	8	5	15	20	204,575	72,772	277,347
Total	8	5	18	23	204,575	72,772	277,347

### PRODUCTION OF CHARCOAL PIG IRON BY STATES.

Massachusetts	1	1	1	2	8,581	4,229	12,810
Connecticut	2	1	2	3			
New York	0	0	2	2	2,804	2,375	4,679
Pennsylvania	4	3	3	6	1,327	1,913	3,240
Maryland	0	0	1	1			
Virginia	1	1	3	4	16,533	15,917	32,450
Alabama	2	2	2	4			
Georgia	0	0	2	2			
Texas	0	0	1	1			
Kentucky	0	0	1	1	445	1,893	2,338
Tennessee	1	0	1	1			
Mississippi	0	0	1	1			
Ohio	0	0	2	2	750	1,251	2,001
Michigan	7	7	5	12	115,183	108,896	224,079
Wisconsin	1	1	0	1			
Minnesota	1	1	0	1			
Missouri	0	0	1	1	31,059	27,325	58,384
Oregon	0	0	1	1			
California	0	0	0	0			
Total	20	17	28	45	*176,182	163,799	*339,981

\*Include small quantities of pig iron and ferro-alloys made with charcoal and electricity.

### TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Bituminous	276	183	211	394	16,107,845	14,241,128	30,348,973
Anth. & anth. & coke	8	5	18	23	204,575	72,772	277,347
Charcoal	20	17	28	45	176,182	163,799	339,981
Total	304	205	257	462	16,488,602	14,477,699	30,966,301

## Miscellaneous Pig Iron Statistics.

### PRODUCTION OF PIG IRON IN PENNSYLVANIA AND OHIO.

Districts, Gross tons.	Blast Furnaces.				Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.)		
	In blast June 30, 1913.	December 31, 1913.			First half of 1913.	Second half of 1913.	Total for 1913.
		In.	Out.	Total.			
Pennsylvania							
Lehigh Valley	12	9	13	22	580,591	473,095	1,053,686
Schuylkill	11	8	10	18	484,257	381,702	865,959
L. Susq.	8	6	9	15	372,781	262,298	635,079
Junata	2	2	5	7	80,110	60,063	140,173
Allegheny Co.	41	24	23	47	3,128,446	2,871,097	5,999,543
Shenango Valley	22	11	13	24	1,222,686	1,066,007	2,288,693
Miscel. bitum.	17	15	7	22	1,013,883	953,245	1,967,128
Charcoal	4	3	3	6	2,304	2,375	4,679
Mahoning Val.	22	11	14	25	1,512,690	1,475,280	2,987,970
Hocking	0	0	1	1			
Lake Counties	17	12	5	17	1,142,044	1,085,493	2,227,537
Miscel. bitum.	13	7	8	15	788,074	679,934	1,468,008
H. R. bitum.	10	10	5	15	216,915	227,094	444,009
H. R. charcoal	0	0	2	2	750	1,251	2,001
Ohio							

### PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York	360,813	204,947	565,760
Pennsylvania	2,351,308	2,128,071	4,479,379
Maryland	152,002	137,957	289,959
West Virginia, Kentucky, and Tenn.	156,359	137,486	293,845
Ohio	2,263,949	1,922,754	4,186,703
Illinois, Wisconsin, Colorado, and California	1,001,535	776,204	1,777,739
Total	6,285,966	5,307,419	11,593,385

### PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON IN PENNSYLVANIA AND OHIO BY DISTRICTS.

Pennsylvania			
Lehigh Valley	120,294	140,678	260,972
Schuylkill Valley	70,420	42,399	112,819
Lower Susquehanna Valley	1,314,068	1,165,719	2,479,787
Allegheny County	846,526	770,275	1,616,801
Shenango Valley	950,925	890,635	1,841,560
Miscellaneous bituminous	707,533	566,939	1,274,472
Mahoning Valley	575,491	465,180	1,040,671
Lake Counties			
Hanging Rock bituminous			
Miscellaneous bituminous			
Ohio			

### PRODUCTION OF BASIC PIG IRON, INCLUDING CHARCOAL IRON.

New York and New Jersey	264,661	299,691	564,352
Pennsylvania—Allegheny County	1,697,820	1,616,950	3,314,770
Other counties	1,959,780	1,661,482	3,621,262
Virginia	463,539	367,049	831,188
Alabama	815,900	959,325	1,775,225
Ohio	1,162,902	1,004,487	2,167,389
Indiana and Illinois	145,409	118,151	263,560
Michigan, Missouri, and Colorado			
Total	6,510,011	6,027,735	12,537,746

### PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Pennsylvania	111,243		
Illinois		118,591	229,834
Colorado			
Total	111,243	118,591	229,834

### PRODUCTION OF ALL KINDS OF PIG IRON FROM 1909 TO 1913.

States—Gross tons.	Production—(Includes spiegeleisen, ferro-manganese, etc.)				
	1909.	1910.	1911.	1912.	1913.
Massachusetts	18,388	16,582	9,649	17,366	12,810
Connecticut					
New York	1,733,675	1,938,407	1,562,756	1,939,231	2,187,620
New Jersey	294,474	264,781	40,603	36,876	
Pennsylvania	10,918,824	11,272,323	9,807,073	12,552,131	12,954,940
Maryland	286,856	326,214	255,816	219,546	289,959
Virginia	301,134	444,976	293,642	256,167	341,815
Georgia					
Texas	26,072	14,725	1,200		
Alabama	1,763,617	1,939,147	1,712,211	1,862,661	2,057,911
West Virginia	228,282	174,661	291,472	274,360	
Kentucky	86,371	100,509	95,202	69,760	315,731
Mississippi					
Tennessee	333,845	397,069	324,648	338,235	280,541
Ohio	5,651,545	5,792,112	5,310,506	6,802,493	7,129,525
Illinois	2,467,156	2,675,646	2,108,002	2,587,359	2,927,977
Indiana					
Michigan	964,289	1,250,103	1,163,932	1,770,628	1,775,883
Wisconsin					
Minnesota	348,177	307,200	276,807	303,270	367,326
Missouri					
Colorado					
Washington	282,766	428,612	395,008	397,731	324,263
California					
Total	25,795,471	27,303,567	23,649,547	29,726,937	30,966,301

The city of Winnipeg, Canada, has awarded a contract for 1000 tons of pipe to the American Cast Iron Pipe Company, Birmingham, Ala.

The Brown Hoisting Machinery Company, Cleveland, Ohio, has been awarded a contract for a large coal bridge to be erected at the Alice mine, near Greenville, Pa.  
**MECHANICAL AND CIVIL ENGINEERS**  
**PITTSBURGH, PA.**

## THE STEEL CORPORATION SUIT

### The Defense Carries Its Investigations Into the Realm of Economics

On Wednesday, February 11, the only witness examined for the defense in the suit for the dissolution of the United States Steel Corporation was J. W. Jenks, professor of economics at the University of New York. He testified that the purchasing power of iron and steel commodities had decreased since the formation of the Steel Corporation, while the purchasing power of commodities in general had increased. He asserted, as the result of his studies of statistics of prices that, taking 100 as a basis for the years from 1895 to 1900, for the 12 years prior to the formation of the Steel Corporation the purchasing power of iron and steel was 104 per cent. and for the 12 years following its formation the purchasing power averaged 87½ per cent.

He further said that the purchasing power of steel in England in 1911 was 90.36 per cent. and in Germany 90.44 per cent.; in this country, in 1911, it was 72 per cent., thus showing that steel is worth more abroad, relatively, than it is here. His figures also showed that since the period 1895-1900 the value of steel as expressed in other commodities has decreased 28 per cent.

In continuance of the policy of the Steel Corporation's attorneys to discredit tabulations of prices taken from trade journals by the Government's lawyers, the following colloquy took place:

#### AN EXPERT OPINION ON TRADE PAPER PRICES

Q.—Professor Jenks, I now call your attention to Government exhibit No. 249, volume V, part 1, page 1656, which purports to show the average price of ten iron and steel commodities in the United States, and the average money price from January 1, 1895, to April 1, 1901, as contrasted with the average money price from April 1, 1901, to February, 1909, and I ask you whether, in your opinion, that is a scientifically fair method of testing or of contrasting prices before and after the organization of the United States Steel Corporation, which took place about April 1, 1901?

A.—In my judgment it is not.

Q.—Why not? And before you answer that question I call your attention to the note at the bottom of this exhibit to the effect that all prices are based on quotations in *The Iron Age*, except those for standard rails, which are taken from reports of the American Iron and Steel Association.

A.—There are a number of reasons why that seems to me incomplete and unscientific. In the first place, the quotations in *The Iron Age* or in the reports of the American Iron and Steel Association do not represent actual buying and selling prices, but simply the general trend of prices in these special commodities at that time, and more frequently, perhaps, the general asking price by some of the leading sellers. In the second place, the selection of a short period of years to represent an average price which shall be taken as a base is always dangerous, is likely to be misleading, and very often does misrepresent actual conditions.

In addition to the presentation of his views on prices, Professor Jenks was examined on the subject of the ability of the Steel Corporation to drive competitors out of business. His conclusion was that to attempt to do so by making prices so low as to compel competitors to lose money would be ruinous to the corporation.

On Friday Professor Jenks was cross-examined. Much time was spent in getting his opinion regarding advantages possessed over competitors by large combinations. Judge Dickinson, attorney for the Government, read a number of extracts from the professor's book, "The Trust Problem," published in 1900, and the professor admitted that his study of the situation then was not so complete as it might have been and should have been. Professor Jenks was also cross-examined with regard

to tables of prices of commodities other than iron and steel which had been used in his testimony of the previous day.

Percival Roberts, Jr., director of the Steel Corporation, appeared to explain a statement he made while on the witness stand last fall, which was that it would be an impossibility for the corporation to crush or drive its competitors out of business, and proceeded to elaborate his reasons for making this statement. He was cross-examined at length with regard to influences governing prices.

### Youngstown Sheet Increases Capital

The Youngstown Sheet & Tube Company, Youngstown, Ohio, has authorized the sale of an additional \$3,080,700 of common stock. The capital stock of this company was some time ago increased from \$6,000,000 to \$10,000,000, \$3,000,000 being stock dividends taken out of the surplus and \$1,000,000 new subscriptions. When the authorized capital stock of the company was increased from \$10,000,000 to \$20,000,000, it declared \$5,000,000 stock dividend out of the surplus, making the paid-in capital \$15,000,000. It then sold approximately \$500,000 of the treasury stock to its principal employees, and it is now selling to its stockholders an additional 20 per cent. of the present outstanding stock, or one share for each five shares outstanding, which will make the outstanding common stock approximately \$18,600,000 and the outstanding preferred stock \$5,000,000.

The company was organized in 1900 with a capital stock of \$400,000, which, before the construction of the plant, was increased to \$600,000. Within a few years this was increased to \$6,000,000 and in 1909 was made \$10,000,000. Later the capitalization of \$20,000,000 was authorized. The new issue will be taken up by stockholders at the par value of \$100 a share. The report that the company will use a good part of the increase in its capital stock in making large additions to its pipe mills is not correct, although at some future time it will probably build a mill for making 2-in. and 3-in. lap-weld sizes exclusively. As yet nothing definite has been decided in reference to new additions, but they will be in the shape of finished capacity to take care of surplus steel, probably jobbing mills for making heavy sheets.

### New Officers of the Mining Engineers

The American Institute of Mining Engineers, which is holding its annual meeting in the Engineering Societies' Building as this issue goes to press, has elected the following officers for the ensuing year: President, Benjamin B. Thayer, president Anaconda Copper Mining Company, New York City. Vice-presidents: Succeeding Mr. Thayer as first vice-president, Sidney J. Jennings, consulting engineer, New York; Herbert C. Hoover, Bewick, Moreing & Co., London, England; William L. Saunders, president Ingersoll-Rand Company, New York. Directors: Reginald W. Brock, Geological Survey, Ottawa, Ont.; Henry Lloyd Smyth, professor of mining and metallurgy, Watertown, Mass.; Daniel C. Jackling, general manager, Utah Copper Company, Salt Lake City, Utah. The foregoing are directors to fill the vacancies occurring this year, the directorate as a whole being divided into three classes, each class to serve three years. One of the directors is elected as director and president and then serves two years on the board as past president. The retiring president, Charles F. Rand, president Spanish-American Iron Company, accordingly remains in the board as past president.

The American Steel Foundries reports net earnings of \$2,031,271 for the year ended December 31, 1913, against \$1,543,838 for 1912 and a deficit of \$514,802, after fixed charges, for 1911. The surplus available for dividends on the business of 1913 was \$1,033,592. The charges for the year included an appropriation of \$246,309 for the retirement of 4 per cent. debentures, the provision for which became operative in 1913.



## FREIGHT ADVANCE OPPOSED

### Pittsburgh, Buffalo, Youngstown and Eastern Pennsylvania Iron and Steel Men Make Protests

WASHINGTON, D. C., February 12, 1914.—The Interstate Commerce Commission yesterday heard representatives of the iron and steel industry on the question of the reasonableness of the proposed 5 per cent. advance in freight rates in Eastern classification territory. While those who appeared were formally designated as protestants, nearly all based their complaints upon inequalities and discriminations existing under the present tariffs.

#### DESIRE RAILROADS FIRST TO ADJUST INEQUALITIES

Throughout the statements of the iron and steel men, as well as in the testimony of witnesses representing other trades which has been given here the past week, it was made clearly apparent that the attempt of the carriers to secure at this time a small general increase is being opposed chiefly for the purpose of compelling the railroads to adjust inequalities. The attitude of the carriers, as reflected in the general statements of and cross-examination by their attorneys, is decidedly conciliatory and indicates that there is a general movement by the railroads to remove the causes of the complaints of the shippers.

The iron and steel manufacturers who appeared before the commission yesterday, either by attorneys or witnesses, were the Pittsburgh Steel Company, Jones & Laughlin Steel Company, Lackawanna Steel Company, Alan Wood Iron & Steel Company, Empire Steel & Iron Company, Youngstown Sheet & Tube Company, 16 blast furnace interests in the Mahoning and Shenango valleys and the Ontario Iron Ore Company and Ontario Mineral Company, Wayne County, N. Y.

#### MOST OBJECTIONS AGAINST ADVANCE ON RAW MATERIALS

While certain of the protestants objected to the proposed advance as affecting finished and semi-finished iron and steel products, in the majority of cases the objections were based upon the advance as applying to coke, coal and ore.

W. A. Glasgow, Jr., representing the Lackawanna Steel Company, told the commission that the protest of that company was confined to the rate on coke from Connellsville to Buffalo, the company having no objection to the proposed general increase in freight rates in Eastern classification territory. He said that in 1902 the coke tariff was fixed at \$1.50 per ton, in 1903 it was raised to \$1.60, in 1907 to \$1.65 and in 1910 to \$1.85. His company had protested against the \$1.85 rate and had made a formal complaint to the commission. This had not yet been formally ruled upon, but he asserted that the carriers had utterly failed to justify the \$1.85 rate. In his opinion the commission should not permit the proposed advance to apply to the rate on coke from Connellsville to Buffalo until the complaint heretofore lodged has been finally ruled upon.

#### PITTSBURGH STEEL COMPANY OPPOSES ORE AND STEEL ADVANCE

C. B. Ellis, for the Pittsburgh Steel Company, stated the objection of that company to the proposed increase in the rate on iron ore from lower Lake ports to the Pittsburgh district. The existing rate of 88c. per ton was established less than six months ago and, he said, already yields to the car-

riers an undue profit. He emphasized the fact that iron ore is a low grade commodity moving in tremendous volume from Lower Lake Erie ports to the Pittsburgh district. It always moves in carloads and frequently in train loads. It moves in its greatest volume between a limited number of points, and from the Pittsburgh district there is a full back-haul of coal. The facilities of the railroads devoted to the transportation of iron ore consist only of those necessary for its transportation. The railroads deliver the cars, often trains, containing ore on the private sidetracks of the consignees who unload the ore and return the empty cars to the railroads.

These and other considerations, he said, tend to make the cost per unit of traffic of transporting iron ore lower than that of nearly all other freight, particularly class freight. The profit derived from the transportation on iron ore at the present rate being considerably greater per unit of traffic than that derived from the transportation of traffic generally, especially class freight, it would be unjust to further increase the rate on iron ore. He also called attention to the fact that the present rate of 88c. per ton is now under attack in a proceeding before the commission.

Mr. Ellis also protested against the proposed advance as applying to iron and steel articles, especially billets, bars, hoops, fencing, etc., from Pittsburgh to typical points in official classification territory. There was, he said, an enormous tonnage and steady traffic in finished and semi-finished steel products which made for a low cost per ton to the carriers. These products, he said, now pay more than a fair rate as compared with other commodities and produce an excessive revenue.

#### POSITION OF YOUNGSTOWN INTERESTS

Richard Jones, Jr., representing the Youngstown Sheet & Tube Company and 16 other concerns in its locality, reviewed the complaints of those companies already before the commission, challenging existing rates on coke from the Connellsville district to the Mahoning and Shenango valleys, the rate on coal from the Pittsburgh district and the rate on ore from lower Lake ports. The rate on coke, he said, was recently reduced by the commission, but not so much as the protestants desired. All the railroads handling coke earn vastly more on that article than on other commodities and this, he said, the carriers freely admit. If the existing rate is raised 5c. per ton and the recent finding of the commission cutting off the free service of spotting cars are put in force, the resulting rate on coke will be more unreasonable than ever. What is true of coke, he said, applies also to coal.

As to the rate on ore, he said the commission was already investigating that particular item and he had no doubt as to the outcome. The carriers, he said, had a cheap method of handling ore and were dissipating their revenues by leasing their docks and stevedore facilities. The commission's inquiry concerning the reasonableness of the rates on ore from Lake ports was undertaken on its own initiative, which was an additional reason why no increase should be allowed until the case was settled. Mr. Jones also protested against the proposed advance as applying to rates on limestone. The proposed increase from 35c. to 40c., instead of being 5 per cent., was equivalent to 14.3 per cent.

Frank E. Young, on behalf of the Ontario Iron Ore Company and the Ontario Mineral Company, of Wayne County, N. Y., made a brief statement protesting against the rates from the mines of those companies to various points. These rates being unreasonably high at present, any proposition to raise

them would merely emphasize the existing inequality and increase their discriminatory character.

#### THE JONES & LAUGHLIN PROTEST

George C. Wilson, for the Jones & Laughlin Steel Company, entered a general protest against the proposed increase in rates on iron and steel products out of Pittsburgh. He said that his complaint was directed rather against the inconsistencies in the rates on east bound and west bound traffic than upon the actual tariffs, and he quoted numerous figures in this connection. Iron and steel products, he said, constituted the most desirable class of freight. In all cases the freight weighed more than the car, and the carrier thus hauled less dead weight in handling iron and steel than almost any other class of freight. Little risk attended shipments, and in case of accident the salvage was usually almost the whole value of the freight. The car-mile earnings on all classes of iron and steel, he said, were relatively high, as the figures of the carriers would show. In 1903 an increase of 10 per cent. in rates from Pittsburgh, both east and west, were put in force and in 1907 another 10 per cent. raise was made, thus increasing the rates 20 per cent. in 10 years, or more than on any other commodity. He also protested against the proposed advance of 5c. per ton in the 35c. rate on limestone to Pittsburgh.

#### CASE OF EASTERN PENNSYLVANIA INTERESTS

W. A. Glasgow, Jr., also appeared for the Alan Wood Iron & Steel Company, Empire Steel & Iron Company, Worth Bros. Company and other eastern Pennsylvania manufacturers, protesting against the rate on coke from West Virginia points to eastern Pennsylvania and New Jersey. He put several witnesses on the stand, among them L. N. Moon, traffic manager of the Empire Steel & Iron Company, who testified that the interstate rates are more or less based upon intrastate rates which have always been very high and discriminatory. The proposed advance emphasizes these discriminations at a time when the pig-iron trade could not stand any additional burdens. Prices are declining, he said, while labor costs are high and coke is higher than at any time in the past four or five years, except in the early months of 1913. In this connection Mr. Moon put in evidence a chart of coke prices taken from *The Iron Age*. On cross examination by attorneys for the carriers, Mr. Moon said that if the inequalities complained of were corrected his company would have no objection to the proposed general increase.

J. S. Stillman, secretary-treasurer of the Empire Steel & Iron Company, said that the competition of pig iron made on the Great Lakes was severely felt in eastern Pennsylvania and that recent tariff legislation had tended to depress pig iron, although there had been no great importations. Only 38 per cent. of the furnaces in the eastern Pennsylvania district are now in blast.

W. P. Worth, Worth Brothers Company, stated that the rates on coke were very high to points in eastern Pennsylvania as compared with the rates to Western points and he, therefore, opposed any increase in rates until the inequalities were corrected. Eastern furnaces, he asserted, are now penalized \$1 per ton as compared with Western competitors. "I want to go on record," the witness said, "as not opposed to an increase, if proper adjustments are made, for we cannot stand the advance until these inequalities are removed. Give us the readjustment we need and we are heartily in favor of an increase in rates."

Attorneys for several of the companies represented at the hearing gave notice that they would file briefs and present arguments when the case is finally heard by the full commission. W. L. C.

#### New Open-Hearth Plant at Youngstown

The Youngstown Iron & Steel Company, Youngstown, Ohio, of which John O. Pew is president, has decided to build an open-hearth steel plant adjacent to its works. It will probably have a daily capacity of 500 to 600 tons of sheet bars, all of which it is expected will be consumed by the company in its own mills. These comprise eight hot sheet mills, two jobbing mills and one plate mill, equipped to roll plates up to 62 in. wide. This week all of the sheet and jobbing mills are running full, but the plate mill is idle. The company has used as much as 140,000 tons of sheet bars in one year, most of which have been bought recently from the Republic Iron & Steel Company and Youngstown Sheet & Tube Company. It is expected that work on the new steel plant will start in the early spring, to be pushed to completion as fast as possible. The company has sufficient ground beside its present works to accommodate the new plant.

#### New Iron Ore Body in New Jersey

The Thomas Iron Company recently struck a very large body of iron ore at its Richard mine, near Wharton, N. J. An analysis made by Dr. P. W. Shimer, Easton, Pa., shows 66.58 per cent. metallic iron, 0.35 per cent. titanium and 0.070 per cent. vanadium. This is probably the highest percentage of vanadium that has been found in the New Jersey magnetites. The vein of ore at the Richard mine is now 13 ft. in width. In the past year the ore has averaged 58 per cent. iron, natural. The Thomas Iron Company in a recent investigation of the product of its furnaces found 0.036 per cent. vanadium in a cast of No. 2 X foundry iron. Further tests are being made and some interesting developments are expected on the line of the investigation made by Dr. P. W. Shimer, and reported by him in a paper on vanadium presented at the February meeting of the American Institute of Mining Engineers in 1912.

It is announced that Boston capitalists have in contemplation the building of a workingmen's model village adjacent to the new motor car plant of the Stevens-Duryea Company, East Springfield, Mass. Adjoining the 40-acre tract of the motor car company is a 60-acre tract which it is proposed to utilize by building attractive houses which are to be let at moderate rentals. The plan calls for laying out water and sewage systems, streets and parks. Several other industrial enterprises have begun negotiations for moving to East Springfield, and with those already in the vicinity there is promise of a thriving industrial community being established. The present Stevens-Duryea plant employs 1600 men.

A shipment of 850 tons of steel castings in 26 carloads was recently made by the Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa. It is part of a consignment of castings and machinery for the new steel plant of the Broken Hill Proprietary Company at New Castle, Australia. The Birdsboro company has also lately received an order for the turbine castings for the battleship Pennsylvania under construction by the Newport News Shipbuilding & Drydock Company, Newport News, Va. It is building a new 10-ton crane runway, of 50-ft. span and 300 ft. long, parallel with the steel foundry, to be used for handling and storing raw material.

Advices received in the United States are that the Stavanger Electro Steel Works at Jorpeland near Stavanger, Norway, has been operating a 3½-ton Roehling-Rodenhauser electric induction furnace steadily for nine months, manufacturing tool steel and steel castings of excellent quality.



### A Brief for Chilled Iron Car Wheels

From a paper by George W. Lyndon, prepared for the Association of Manufacturers of Chilled Car Wheels, the following points regarding the chilled wheel are obtained:

On the basis of statistics obtained from the Interstate Commerce Commission it is estimated that there are 20,000,000 chilled iron wheels in service. In the last three years more than 300,000 special chilled iron wheels have gone into freight service, the majority of them on cars of 50 tons or greater capacity and many operating in localities where severe conditions are imposed. One test is mentioned of a large railroad which in 1907 equipped 50-ton coal cars to the number of 500 with special chilled wheels. The cars operate, as a rule, in mountainous country and are constantly in service. It is found that at the close of the sixth year more than 80 per cent. of the wheels are still in service, and it is predicted that the average life will prove to be eight to ten years.

Mr. Lyndon considers that chilled wheels have the following advantages over other types of wheels:

Greater economy in first cost and shop expense.  
Less loss of metal in tread and flange per ton mile of service.

Greater ability to carry heavy loads, as the tread metal does not flow under pressure.

Twenty to 25 per cent. greater braking efficiency.

Twenty to 40 per cent. less consumption of brake shoes.

Less abrasion of steel rails.

Less power consumption.

### Charters for Bethlehem Iron Ore

The Bethlehem Steel Company has recently made a contract in England for the carrying of its Chilean iron ores from Tofo in Chile to the United States for a period of 20 years. A special fleet of steamers will be built by the English interests with which the charters have been placed, and the vessels will have a capacity of 16,000 to 17,000 tons. Contracts for several of these steamers have already been given to English shipyards. The negotiations for the charters have been carried on by Henry P. Snyder, vice-president of the Bethlehem Steel Company, who has been abroad for some weeks. The Chilean ores will be brought to New York harbor, arrangements having been made with the Lehigh Valley Railroad for the building and equipping of docks at its terminals. No ore will be shipped until the opening of the Panama Canal. The Cuban ores of the Bethlehem Steel Company and the Swedish ores for which it has a contract covering a period of years will continue to be unloaded at Philadelphia.

The Detroit Steel Casting Company, Detroit, Mich., has opened a new department devoted exclusively to the manufacture of steel castings under 25 lb. The converter for producing steel for the small castings is run in conjunction with the open-hearth furnace, from which an advantage is derived in the production of steel of high quality, being enabled to dispose of the remelt from the small castings to the open-hearth furnace and permitting the use of nothing but the highest grade of new material in the manufacture of the intricate small work. The claim is made that steel is thus produced in the converter of an analysis equal if not superior to the highest grade of steel made in the electric furnace.

It is estimated that the present year Canada will make nearly 1,000,000 tons of steel, which is more than the United States produced in 1879. Prior to 1902 Canada made very little steel. The output increased from 26,084 gross tons in 1901 to 182,037 tons in 1902. Five years later, in 1907, it had reached 646,754 tons, and in 1912 it had increased to 853,031 tons, the largest output in the country's history.

### American Can Company's Year

The profits of the American Can Company on the operations of the year ended December 31, 1913, were smaller than had been expected. The net earnings were \$6,595,679, against \$7,522,932 the preceding year. The surplus after charges of \$350,000 for interest, \$600,000 for depreciation and \$612,762 for improvements, etc., was \$5,032,917. The conditions which brought about this somewhat disappointing result, although the total business done was the largest in the history of the company, are thus explained by President F. S. Wheeler, in his report to the stockholders:

"The past year has been in many ways difficult because of developments not apparent at its commencement. In the spring, the floods caused a large direct damage to factories at Hamilton, Ohio, and New Castle, Pa., and considerable indirect loss due to transferring orders from these factories to others less favorably situated. The company, by so doing, cared for the wants of those consumers ordinarily supplied from these factories without inconvenience to them, again demonstrating its ability for its trade in emergencies.

"The financial stringency, which became pronounced as the year progressed, brought perplexing questions to all business men and affected the company through falling values of materials and metals and compelled some customers to curtail their operations. During the greater part of the year, there was a scarcity of labor at many places, resulting in an increased cost of production.

"The foregoing conditions caused competition, always keen and active, to become more aggressive, resulting in a somewhat lower average profit."

The company expended in 1913 for new construction and equipment \$2,566,187. The working capital is \$15,800,370. Holders of preferred stock received a dividend of 24 per cent. to apply on accumulated unpaid dividends, leaving at the close of the year 8¾ per cent. still due them.

With regard to relations with employees, President Wheeler says: "The safety department has made excellent progress in providing safeguards in the factories wherever possible and in generally improving working conditions. The result has been evident to a gratifying degree in a reduction in the number of injuries and improved relations between the managers and employees. The department will be continued and its scope enlarged."

Of the suit brought against the company by the United States Government for alleged violation of the Sherman anti-trust law, the report says: "Able counsel have been retained to defend this action vigorously and they and your officers expect to do so successfully."

The Peerless Drawn Steel Company, Massillon, Ohio, will shortly begin manufacturing operations. It will occupy the old plant of the Massillon Bridge & Structural Company, which has been rebuilt. The company will make a specialty of high carbon shaped wire products in open-hearth, Bessemer and alloy steels and will give special attention to odd shapes in common or special grades of steel. Fred H. Snyder is president; David Reed, vice-president, and R. H. Birney, secretary and treasurer.

The Baldwin Steel Company, Charleston, W. Va., is considering the building of a new steel plant in Ironton, Ohio. Anton Boerders, president and general manager of the company, was in Ironton a few days ago investigating the local conditions and it is expected that the project will be given consideration by the Ironton Board of Trade. It is reported that if the deal goes through the plant now at Charleston will be removed to Ironton.

# The Machinery Markets

Improvement in buying and in volume of inquiries is slow but none of the markets report any decided falling off in such activity as has prevailed in the last few weeks. New York is a trifle more quiet but regards prospective railroad buying hopefully. In New England business and favorable sentiment continue to grow, iron foundries are busier and machine tool houses have received some good orders but there is much room for betterment. A better feeling continues in Philadelphia, but important inquiries are lacking. Single tool purchases continue a feature in Cleveland and the volume of trade is sustained but not greatly increased. Inquiries far exceed sales in Cincinnati and optimistic expressions are heard, but buying should be heavier. The trade in Detroit is irregular with most sales and inquiries small. Actual purchasing in Milwaukee is not large, but factory extensions are making new business. Improvement is shown in the Central South. St. Louis conditions have improved also with increased inquiries from outlying territory. Business is better in Birmingham but not as good as at this time last year. In Texas conditions are improved and outside capital is showing more interest in developments in that State. In the Pacific Northwest mining and mill prospects are coming to an issue slowly, though machinery dealers report a fair business in taking care of current demand.

## New York

NEW YORK, February 18, 1914.

In this market, the only change, if any, is a slight diminution of both inquiries and sales. The latter continue to be scattered and to call for special or automatic machinery rather than for standard machine tools. Second-hand tools are quieter. The announcement that the time for the freight rate decision will be extended has set the trade to wondering. The hope that the railroads would begin long deferred buying at an early date is not abandoned by any means, especially in view of the excellent lists which are out, but the postponement of the decision has revived anxious speculation as to just when there will be plain sailing ahead.

When the American Locomotive Company discontinued the manufacture of the Alco automobiles at Providence, R. I., some months ago, there was considerable interest shown as to what disposition would be made of the machine tool equipment of that plant. It is now learned that at least a part of the machinery is being transferred to the works of the American Locomotive Company, Schenectady, N. Y. This move may result in the locomotive company being less of a factor in the market for new machines, yet most of the trade regards the transfer as preferable to throwing the equipment on the second-hand market.

P. A. Cazes, M.E., 4427 Dryades street, New Orleans, La., as representative of a company in Florida, is in the market for a number of used machine tools and other shop equipment. He desires to receive lowest cash prices and particulars on equipment that is modern and in good condition, including the shop number and date each machine left the maker's hands, its trade name, time used and present condition and point of shipment. The list follows:

### Used Machines Wanted in Florida

One engine lathe, 24 in. to 30 in. x 8 ft. to 14 ft. C.R. (Q.C.G. preferred).  
 One engine lathe, 14 in. to 16 in. x 8 ft. to 10 ft. C.R. (Q.C.G. preferred).  
 One engine lathe, 9 in. to 12 in. x 6 ft. to 8 ft. C.R. (Q.C.G. preferred).  
 One driving wheel or axle lathe (old style).  
 Lathe and drill chucks.  
 One bolt threading machine.  
 One pipe threading machine.  
 Three emery grinders.  
 One cold metal saw.  
 One set forming or bending rolls.  
 One disc grinder.  
 Flexible shafts.  
 Six machinist vices.  
 One steam or air hammer.  
 One forge blower.  
 One portable crane.  
 One alligator or rotary shear.  
 One punch press.  
 One air compressor (for shop purpose).  
 One planer (submit sizes in stock).  
 One shaper, 16 in. to 24 in.  
 One radial drill, 4 ft. to 5 ft.  
 One sensitive radial drill.

One steam pile driver.  
 One speed lathe (for wood).  
 One scroll band saw (for wood).

Winter Brothers, Buffalo, N. Y., have plans in progress for a bottling works to be built at North and Ellicott streets.

Captain Norton, acting commissioner of public works, Buffalo, has been authorized to obtain bids for a sterilization plant.

The A. L. Swett Iron Works, Medina, N. Y., is completing plans for a foundry building 70 x 150-ft., one-story, to be erected in the spring.

Plans for the construction of a sewage disposal plant at Rochester, N. Y., have been approved by the State Board of Health. E. A. Fisher is city consulting engineer.

The Stanwear Mfg. Company, Rochester, N. Y., has filed incorporation papers with a capital stock of \$30,000, to manufacture special machinery and metal specialties. A factory will be equipped for the purpose. V. H. Askarian, A. M. Ballarian and F. B. Taylor, Rochester, are the incorporators.

A considerable quantity of machinery will be required for the equipment of the steel and brick factory building, 50 x 120 ft., one story, to be erected at Kingston, N. Y., by the Wemlinger Steel Piling Company, 11 Broadway, New York.

The F. Westpfal Company, Baldwin, N. Y., has been incorporated with a capital stock of \$40,000, to manufacture cutlery, tools and machinery. Fred. Westpfal, M. M. Levy and George Graff, Jr., are the incorporators.

Joseph Carlson, 221 Weeks street, Jamestown, N. Y., has plans in preparation for a furniture factory, 64 x 80 ft., four stories, which he will erect in the spring.

The James Elgar Company, Hornell, N. Y., has plans in progress for the enlargement of its plant.

The Lockport Shale Brick Company, Lockport, N. Y., is completing plans for its brick factory. A building 38 x 96 ft., two stories, and a building 36 x 40-ft., one story, will be erected at a cost, including equipment, of \$50,000. R. A. Whiston, Hudson Terminal Building, New York, is the architect.

The W. H. Mandaville Company, Olcott Beach, N. Y., is preparing plans for the enlargement of its cold storage building to three times its present capacity and a chemical refrigerating plant will be installed.

An addition 112 x 246 ft., two stories, is to be made to the plant of the Medina Cold Storage Company, Medina, N. Y., at a cost of \$85,000.

A bakery building, 88 x 110 ft., two stories, is to be erected by C. F. Schupp & Sons, Albany, N. Y., to cost, with equipment, about \$30,000.

### Catalogues Wanted

S. Hollander, dealer in machinery and motors, 30 Church street, New York, desires to receive catalogues from manufacturers of lathes, shapers, planers, milling machines, turret lathes, boring mills, motors, tinsmiths' and woodworking machinery.



## New England

BOSTON, MASS., February 17, 1914.

Business continues to increase. The favorable sentiment shows no abatement. However, it must not be understood that a really high basis of production has been approached, especially in the machine tool trade, which, as everybody familiar with the industry realizes, is one of the last to experience real benefit from a revival. Some very good orders have been booked in the last week; among them one for about 35 large grinding machines, received by a New England manufacturer. The iron foundries—in fact, foundries in general—report a better volume of orders. The pressed metal factories are quite busy, some of them being so rushed that they are making small effort to secure new contracts.

The number of unemployed men has been greatly exaggerated by current report, which includes recent statements of certain New England newspapers. It is conceded that a good number of workmen have been laid off or have been working on short time, but week by week idleness is decreasing as working forces are being built up in order to take care of the better volume of orders. It is safe to state that manufacturing plants in this territory have come 10 per cent. nearer capacities in the last fortnight.

At the annual meeting of the Reed-Prentice Company, Worcester, Mass., held last week, the old board of officers was re-elected as follows: President, George F. Fuller; vice-president and general manager, Albert E. Newton; vice-president, L. J. Knowles; treasurer, George Crompton; directors, Homer Gage, George C. Lee, Charles M. Thayer, Harry W. Smith and George T. Dewey. The company's works are operating on a full-time basis. Among other orders is a very large contract from the Ford Motor Company, Detroit.

The Boston & Maine Railroad has begun operating its locomotive and car repair shops at Billerica, Mass., which were erected at a cost of \$2,500,000. The nucleus of the working force consists of mechanics which have been transferred from Keene and Concord, N. H. The purpose is to consolidate practically all the repair works in this plant and eventually the force will consist of 2000 men. However, certain of the shops will not be abandoned entirely, among these being that of Concord. The shop at Nashua, N. H., which is largely devoted to the manufacture of frogs, will be transferred to Keene. The removal will include the equipment and a large proportion of the workmen.

The Lake Torpedo Company, Bridgeport, Conn., manufacturer of submarine boats, has been reorganized under a Maine charter, and as a result will complete four torpedo boats for the Government. The new board of directors includes Frank Miller, a Bridgeport capitalist. H. S. Miller is president of the company and F. B. Whitney chairman of the board of directors.

The business of the Peck & Young Company, Forestville, Conn., has been acquired by W. L. Humason, president Humason & Beckley Company, New Britain, Conn. The Forestville concern manufactures springs and turned brass work. The company was established some years ago but did not make a success until it was reorganized by F. N. Manross. It is stated that a new corporation will be formed with New Britain men as the officers.

The Rutland Foundry & Machine Company, Rutland, Vt., has been organized with New York men as the interested parties and will erect a building 40 x 100 ft.

At the annual meeting of the American Screw Company, Providence, R. I., the board of directors was increased from 7 to 9 members, the additions being Benjamin Thurston and William G. Smythe. The other directors elected were Samuel M. Nicholson, Charles Alexander, George L. Shepley, John Russell Gladding, George W. Thurston, Marsden J. Perry and Walter W. Griffith. Samuel M. Nicholson was elected president; George W. Thurston, treasurer; Lucien B. Copeland, secretary; Benjamin Thurston, superintendent; William G. Smythe, sales agent; Theodore B. Pierce, treasurer; George F. Staples, assistant secretary; and Albert B. Peck, assistant sales agent.

The Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass., has brought out a new type of geared head lathe, built in sizes ranging from 14 to 30 in. and arranged either for single pulley belt drive from a line shaft or for direct connected constant speed motor.

The Windsor Machine Company, Windsor, Vt., is putting on the market the Gridley automatic multiple spindle drilling machine, which is designed for the rapid drilling of parts which are otherwise difficult to handle. The machine is of the vertical turret type, and drills, reams, counterbores and faces the work. An essential feature is that the spindles, usually from 5 to 9 in number, are adjustable, individually, both radially and circumferentially.

The Stanley Works, New Britain, Conn., has issued notices to stockholders of an increase in its capital stock from \$500,000 to \$2,500,000.

The William H. Page Boiler Company, Norwich, Conn., has increased its capital stock from \$100,000 to \$200,000. The company manufactures heating appliances.

## Philadelphia

PHILADELPHIA, PA., February 16, 1914.

There is a feeling that a better volume of business will develop before long, but important inquiries come out with exasperating slowness. Current sales have been uniformly small. Tool builders have gained little in activity. The local locomotive works continues to gradually reduce its payroll. Foundry activities have not materially increased. There is a fair demand for some classes of second-hand equipment, while others drag. Power plant equipment continues in fair demand.

Builders are estimating on plans and specifications for a two-story brick and steel garage to be erected for B. F. Dewees & Co. on Melon street, below Fifteenth street. George Idell is the architect.

It is stated in the daily prints that the foundry of the Iron City Foundry Company, Lebanon, Pa., was badly damaged by fire. Details are not available, but it is said that the burned portion will be immediately rebuilt.

Sub bids are being taken by Clyde Adams on plans and specifications for a two-story factory to be erected in Muncy, Pa., for Sproat, Waldron & Co. It will cost about \$60,000. Detailed information is lacking.

Plans and specifications are being prepared by Joseph W. Belknap, engineer, it is said, for a one-story brick and concrete pumping station to be erected at Frederick, Md.

C. Emlen Urban, engineer, Woolworth Building, Lancaster, Pa., will receive bids on a four-story factory building to be erected for the Hershey Improvement Company, Hershey, Pa.

The Hamburg Boiler Works, Hamburg, Pa., is in the market for tubing, rails, splices, bolts and one 72-in., 18-ft., butt-joint triple riveted horizontal tubular boiler, all second-hand.

The Flinchbaugh Mfg. Company, York, Pa., manufacturer of gas and gasoline engines, has removed to Greencastle, Pa., and is building a new factory, 80 x 200 ft., and a foundry, 60 x 100 ft. It is in the market for a complete new foundry equipment and a gas producer.

The Cresson Electric & Machine Company, Philadelphia, has been incorporated under the laws of Delaware with a capital stock of \$20,000. L. A. Brownhill, Wilmington, Del., is named as one of the incorporators.

The William Steele & Sons Company, engineer, Philadelphia, has plans practically completed for a new manufacturing plant for G. Levor & Co., manufacturers of kid gloves, Gloversville, N. Y. The plant will replace one recently destroyed by fire. It will include a building 60 x 250 ft., 4 stories, a power plant building, etc. The power plant will generate 250 hp. The engineer will purchase the necessary equipment of boilers, engines, electric power equipment, etc.

## Chicago

CHICAGO, ILL., February 16, 1914.

The National Laundry Machinery Company, Chicago, is building a 3-story factory at Twenty-second and Union avenues, to cost \$40,000.

The Victor Chemical Works, Chicago, is having plans prepared for a \$500,000 plant to be erected at Nashville, Tenn. Sidney Lovell is the architect.

The Addressograph Company, Chicago, has plans under way for a factory, 100 x 125 ft., 6 stories, to be built at Peoria and Van Buren streets, at a cost of \$125,000.

The Western Electric Company has prepared plans which include the building at Hawthorne, Ill., of four additional units, each 60 x 250 ft., 5 stories.

I. Schwinn, Chicago, has taken out a permit covering the erection of a brick factory, 80 x 573 ft., 6 stories, at 1800 North Lawndale avenue, at an estimated cost of \$500,000.

The Kerr Auxiliary Company, Chicago, has been incorporated with a capital stock of \$100,000 to manufacture engines, boilers and machinery. The incorporators include C. W. Greenfield, 175 West Jackson Boulevard; C. V. Kerr, and J. R. Deane.

The factory of the National Milk Flour Company, Chicago, Ill., at Gilberts, Ill., was burned February 12 with a loss of \$50,000. It is stated that replacement is planned.

The building occupied by the Excelsior Steel Furnace Company, 517 West Monroe street, Chicago, was damaged by fire to the extent of \$25,000.

The Steel City Fittings Company, 4734 Kenmore avenue, Chicago, organized by Arthur N. Thomas, L. O. Heikes and W. R. Watson, with a capital stock of \$2400, will manufacture electrical and mechanical devices.

The Elgin Sheet Metal Products Company, Elgin, Ill., has been incorporated with a capital stock of \$5000 to engage in the sheet metal business. The incorporators are Conrad Ekvall, E. O. Ekvall and Charles Nelson.

C. B. Johnson, commissioner, Moline, Ill., will receive bids until February 26 for furnishing one 8,000-gal. centrifugal pump.

B. Chandler, city clerk, Esbon, Kan., will receive bids until February 25 for constructing waterworks to cost about \$27,000.

The Moline-Vacuum-Vapor Heating Company, Moline, Ill., has increased its capital stock from \$35,000 to \$50,000.

It is reported that the Norman Milling & Grain Company, Norman, Ill., is planning to install one 200-kw. generator and one 225-hp. Diesel engine.

The Tri-City Artificial Ice Company, Moline, Ill., has been incorporated with a capital stock of \$100,000 to operate an artificial ice plant, etc.

The plant of the Hagstrom Bros. Mfg. Company, Salina, Kan., has been purchased by J. F. Merrill, president of the Farmers' National Bank of that city, and under the new ownership the operations of the plant will be extended and improvements made.

Bids will be received until February 25 by H. B. Wistrand, village recorder, Excelsior, Minn., for waterworks equipment as follows: One 75,000-gal. hemispherical steel tank, one 75,000-gal. elliptical steel tank, one 200-gal. triplex power pump, direct-connected to 20-hp., 3-phase, 220-volt motor with accessories in place.

The American Cement Plaster Company, Fort Dodge, Iowa, is rebuilding its plaster mill at a cost of about \$100,000. The machinery is to be electrically driven. R. A. Henley, Lawrence, Kan., is general superintendent.

The citizens of Little Rock, Iowa, have subscribed \$9000 for an electric light plant.

It was voted to take over the electric light plant of Denison, Iowa, and rebuild it. Bonds for \$65,000 were voted.

Bids will be received until February 24 by George L. Adams, clerk, for construction of a waterworks system for the village of Niobrara, Neb., to cost \$12,250. Grant & Fulton, Lincoln, Neb., are the engineers.

## Milwaukee

MILWAUKEE, WIS., February 16, 1914.

Factory extensions throughout the State, which require power equipment and tools, form the source of the bulk of business that is being arranged for at this time. Actual purchases are not yet large in volume, but the inquiries point to good bookings a little later. Tool builders enjoy continually improved business and most of these shops are operating at normal capacity. The enlargement of payrolls continues. Structural steel fabricators have good business in prospect and important bridge construction will be done at various points in Wisconsin this year. Everything considered, there is nothing in sight to stop the progress that is being made toward better times.

The Harsh & Edmonds Shoe Company, 694 Hanover street, Milwaukee, plans to build a factory, 80 x 160 ft., 7 stories, of concrete, steel and brick construction, to cost \$75,000. Herman J. Esser, Camp Building, Milwaukee, is the architect.

The addition under construction by the Hamilton Mfg. Company, Two Rivers, Wis., will be devoted to woodworking and has no connection with the company's metal working line, as reported in some quarters.

J. Hamacheck & Son, Two Rivers, Wis., are purchasing a small list of hand and power-driven tools and equipping a complete machine shop at their garage.

The Kahlenberg Bros. Mfg. Company, Two Rivers, Wis., is taking bids for the erection of a model gasoline engine manufactory and chemical laboratory, 60 x 120 ft.

The factory of the Fond du Lac Implement Company, Fond du Lac, Wis., has been purchased by the Soo Railroad and will be razed to make room for a modern freight depot and warehouse.

The I. B. Rowell Company, Waukesha, Wis., will start work March 1 on a foundry building, 100 x 215 ft. S. Breese, Jr., the president, should be addressed in regard to its machinery requirements.

The village of Albany, Wis., has voted to build a waterworks system to cost \$20,000, the funds to be provided by a municipal bond issue. W. G. Kirchhoffer, Madison, Wis., is engineer.

J. Thompson & Sons, Beloit, Wis., manufacturers of farm implements and gas engines, for whose affairs a receiver was recently asked, have been placed in charge of Edwin M. St. John, Rockford, Ill.

Sheboygan Falls, Wis., has issued bonds to the amount of \$49,000 for the construction of a waterworks and an electric light and power plant.

The plant of the Wausau Paper Mill Company, Brokaw, Wis., was damaged by fire February 10. The grinder building, electric power plant, etc., will have to be re-equipped. The loss is estimated at \$120,000.

The Racine Motor Oars Company, Racine, Wis., manufacturer of detachable rowboat motors, is planning to double the size of its factory because of increased business.

The Plymouth Brewing Company, Plymouth, Wis., has purchased the plant and business of the Mount Calvary Brewing Company, Mt. Calvary, Wis., and proposes to rebuild and enlarge the brewery, power plant, etc.

J. A. Hess, Arcadia, Wis., is planning to build a machine shop to cost \$5000.

## Detroit

DETROIT, MICH., February 16, 1914.

Conditions in the local machinery market exhibited but little change the past week. Some dealers had a better volume of sales, but the majority found business rather irregular. All of the sales were of small importance individually. Considerable inquiry came out, but this too was confined, so far as reported, to single tools and small lots. There seems to be no really big business in sight. Second-hand machinery in good condition is in moderate demand and most dealers have stocks of considerable size on hand. Power plant equipment in the smaller units is fairly active. Conditions



in the foundry trade continue to improve slowly. Increasing activity is noted in building circles, but there is not much new in the line of industrial construction work.

The Crampton Automatic Pressure Fastener Company, Detroit, has been incorporated with a capital stock of \$25,000 to manufacture specialties. Basil G. Crampton, Isadore Wolfe and Benjamin Wolfe are the incorporators.

W. E. Bellman, 82 Broadway, Detroit, has taken out a building permit covering the erection of a brick factory, 33 x 50 ft., 3 stories, to cost \$4000.

The National Twist Drill & Tool Company, Detroit, has increased its capital stock from \$200,000 to \$300,000.

Three large building permits were taken out this week for the erection of structures for which some miscellaneous equipment will be required, as follows: Whitney Realty Company, Ltd., 18-story steel store and office building, \$1,000,000; Kern Machinery Company, 6-story reinforced concrete warehouse, \$75,000; and Joseph Mack Printing Company, 5-story reinforced concrete commercial building, \$95,000.

The Bad Axe Granite Company, Bad Axe, Mich., has been incorporated with \$10,000 to manufacture crushed stone. The incorporators are S. W. Murray, Joseph Fremont and Joseph N. Rankin.

L. G. Wade, Holly, Mich., is at the head of a new company which will engage in the manufacture of small motor-driven cultivators.

The Ross Machine Company, Grand Rapids, Mich., has increased its capital stock from \$60,000 to \$150,000 to provide for increasing business.

The Industrial Foundry Company, St. Johns, Mich., whose incorporation was recently reported, has leased the plant of the St. Johns Foundry Company and will begin operations at once. Thomas F. Gaines and John Kozler are among those interested.

The Boehme & Rauch Company, Monroe, Mich., paper box manufacturer, will shortly erect an addition to its plant to cost \$250,000. The new plant will be a complete unit, including a 1000-hp. steam plant and a large box board machine. It is planned to begin construction work in March.

Walter B. Young, Bay City, Mich., has begun the construction of his new woodworking plant at Salzburg, a Bay City suburb. The building will be 120 x 350 ft. and will be equipped with motor-driven woodworking machinery.

The Holland Furnace Company, Holland, Mich., has increased its capital stock from \$100,000 to \$250,000.

## Cleveland

CLEVELAND, OHIO, February 16, 1914.

Business in machine tool lines is coming out in about the same volume as the previous few weeks. While there is considerably more activity than late last year, the demand is still below normal and is confined almost wholly to single tools. The sentiment in the trade and among manufacturers continues to improve, however, and some plant extension work that was held up through the depression will soon be gotten under way. Manufacturing conditions in metal working lines show little change. A few plants are increasing their working forces. In the jobbing foundry trade there has been a slight improvement, but the demand is still dull. However, some foundries are fairly busy.

The Parish & Bingham Company, Cleveland, makers of automobile frames and various steel stampings, will shortly begin the erection of a plant on a new site at Madison avenue and West 106th street. The new plant will be a brick and steel structure, 100 x 900 ft. Traveling cranes and other equipment will be installed.

The Wallis Tractor Company, which recently established a plant in the building formerly occupied by the Royal Motor Car Company, Cleveland, will add considerably to its present equipment. It has specifications out for a number of special automatic screw machines, and a little later will have a list of its requirements in standard tools. The company will make heavy farm and road tractors and plans to equip a plant with a capacity of about 300 tractors per year.

Plans and specifications for the proposed sewage disposal and garbage plant for Akron, Ohio, have been submitted by R. W. Pratt, engineer, Cleveland, and approved by the city council. The estimated cost of the two plants is \$450,000.

The Northwestern Ohio Natural Gas Company will erect a new shop and office building at 109 Sixteenth street, Toledo, Ohio. The building will be 55 x 100 ft., three stories, of brick and steel. Machinery will be installed in the shop department.

The Mansfield Tire & Rubber Company, Mansfield, Ohio, has commenced the erection of a factory addition that will be equipped with presses and other machinery used in the manufacture of automobile tires.

The Ohio Galvanizing & Mfg. Company, Niles, Ohio, is having plans prepared for the erection of a new plant.

The Automobile Products Company, Canton, Ohio, has been organized with a capital stock of \$150,000 by Daniel Thomas, J. F. Moul, and others. It is stated that the company will make automobile parts and other metal products.

The Quaker Oats Company, Akron, Ohio, will enlarge its power plant by the erection of a new building and the installation of two new boilers and other equipment.

The McArthur Brick Company, McArthur, Ohio, will erect a new power house and install two boilers and a 300-hp. engine and generator.

The Auto Call Company, Shelby, Ohio, is having plans prepared for plant improvements.

The U. S. Standard Mfg. Company, Ashland, Ohio, has been organized with a capital stock of \$10,000 by F. R. Marks, C. H. Snyder, and others, to manufacture stove parts, concrete mixers and concrete block machines.

## Cincinnati

CINCINNATI, OHIO, February 16, 1914.

Continued optimistic opinions as to the future are given out by the majority of manufacturers in this territory. However, actual business coming in is not satisfactory to some and not in line with the larger number of inquiries being received. This is especially true as to the machine tool builders. This particular industry shows considerable improvement, but conditions are yet far from normal. Sheet metal working machinery is in better demand, and wood-working equipment also makes a favorable showing.

The Ideal Machine & Tool Company, 128 Opera place, Cincinnati, has increased its capital stock and will enlarge its plant at an early date. The company makes dies, machinery models and other specialties. Additional equipment will be required.

The Purified Products Company, Elmwood place, Cincinnati, has purchased a site on which will be erected a large oil refinery. Considerable special equipment will be needed, including tanks, boilers, etc.

It is reported that the Johnson Wright Furniture Mfg. Company, Grand Rapids, Mich., will soon move its plant to Cincinnati, occupying the old factory of the J. F. Dietz Company on Third street. If these plans are carried out additional machinery will be required.

The Wiedeke Machine Company, Dayton, Ohio, operating a general machine shop, contemplates making an extensive addition to its plant, for which additional tools will be required.

The Computing Appliance Company, Dayton, Ohio, has increased its capital stock from \$30,000 to \$200,000, and has had plans prepared for large additions to its plant. The company manufactures vending and computing devices.

The Riley Shoe Mfg. Company, Columbus, Ohio, contemplates establishing a branch manufacturing plant at Lancaster, Ohio.

The Flexstone Products Company, Columbus, Ohio, has been incorporated with \$75,000 capital stock, by Edward F. Kellie and others, and will establish a plant at an early date.

The American Concentrator Company, whose plant is at Joplin, Mo., has definitely decided to move to Springfield, Ohio, and will increase its manufacturing facilities.

Refrigerating and ice-making machinery will be required by the Bowlus-Hackett Company, Springfield, Ohio. The company is having plans prepared for a four-story cold storage plant.

The O. O. Poorman Company, New Bremen, Ohio, manufacturer of sheet metal working machinery, contemplates an addition to its plant. L. H. Wessell was recently elected general manager.

The Urbana Lighting Company, Urbana, Ohio, will soon be in the market for additional equipment to be installed in its power plant.

The city of Newport, Ky., will soon advertise for bids on a large pump to be installed in its waterworks plant.

The Pope File Company, Columbus, Ohio, has been incorporated with a capital stock of \$25,000 to manufacture files. The principal incorporator is W. A. Pope.

## Wheeling

WHEELING, W. VA., February 16, 1914.

The Roanoke Spoke & Handle Company, Roanoke, Va., will install machinery to double present capacity.

The Consolidated Paper & Box Mfg. Company, Richmond, Va., is erecting a factory 71 x 120 ft., reinforced concrete, and will install paper box machinery.

The Ohio-Guyan Coal Company, Cleveland, Ohio, has been incorporated with a capital stock of \$850,000 to operate in Logan County, W. Va. David E. Evans, S. O. Mathews, T. E. Rook, and others, of Cleveland, Ohio, are the incorporators.

The Universal Mfg. Company, Martinsburg, W. Va., has been incorporated with \$10,000 capital stock to manufacture automobiles, guns, engines, wagons, etc., by C. T. Custer, J. Bland Carr, George W. Dixon, and others.

The J. J. Moss Iron Works Company, Wheeling, W. Va., will erect an addition 50 x 140 ft., costing \$10,000. New equipment will be purchased.

The King-Pocahontas Coal Company, Vivian, W. Va., has been incorporated with \$7,000,000 capital stock by Lewis H. Freedman, Albert H. Maurice, Dennie B. Murray, and others, all of 74 Wall street, New York.

## The Central South

LOUISVILLE, KY., February 16, 1914.

Considerable improvement has been shown in the machinery market in this section. A number of good sales have been made the past week. Refrigerating plants and ice factories are buying, in preparation for their busy season. The market for machine tools is in good condition. Boilers are moving steadily, but slowly. Electrical machinery concerns are doing more business than the past few weeks.

The Laib Company, Louisville, Ky., manufacturer of plumbing supplies, whose buildings were damaged by fire, is building a new factory, 100 x 530 ft., on Eighteenth street. It will be completed in about six weeks. New piping machinery may be required.

H. E. Heimberger, New Albany, Ind., will erect a sawmill and veneer mill. The machinery will cost between \$15,000 and \$20,000.

Henry Pilcher's Sons, Louisville, organ manufacturers, have changed the type of their electric motors. Twenty-five motors were purchased from the James Clark, Jr., Electric Company, Louisville.

The American Oak Leather Company, Cincinnati, Ohio, will install a 250-kw., motor generator set for the operation of leather-cutting machines in its Louisville factory. B. M. Henry, Louisville, is manager.

An ice plant is to be installed by M. M. Hancock, Sebree, Ky., in connection with his flour mill.

The Cadiz Water Company, Cadiz, Ky., will install transformers, switchboards, etc. George L. Smith is general manager.

McDaniel Brothers, Malcolm, Ky., are in the market for a 25 to 35-hp. fire-box, open bottom, water front boiler.

The construction of the Central City, Greenville & Drakesboro Railway, with a 3,000,000 power plant near Central City, Ky., is assured. General T. C. du Pont, Wilmington, Del., is among the incorporators, who also

include a number of New York capitalists. Dr. H. E. Netherland, South Louisville Savings and Deposit Bank, Louisville, is actively interested and will supervise the construction, it is understood. The work is to start soon. Improvements in the equipment at the mines owned by them in the vicinity of Central City are also reported to be contemplated.

J. D. Booth, and others, Carlisle, Ky., are organizing a company with a capital stock of \$25,000 to build an ice plant.

Noel & Co., Nashville, Tenn., will equip an ice plant of 100 tons capacity. E. T. Noel is president.

The Bohlen-Huse Ice Company, Memphis, Tenn., has awarded a contract to G. H. Guthrie for the erection of a manufacturing plant. Special machinery will be purchased later.

The Tennessee Light & Power Company, Chattanooga, Tenn., has been incorporated with a capital stock of \$1,100,000 by Farrand S. Stranahan, and others, of Worcester, Mass.

The Jackson Railway & Light Company, Jackson, Tenn., will improve its power plant. It is planning to install a rotary converter. John Wisdom is superintendent.

The Gordonsville Electric Light & Power Company, Gordonsville, Tenn., will erect a plant to develop 500 kw. Robert Harvey is the engineer.

## St. Louis

ST. LOUIS, MO., February 16, 1914.

The machine tool market shows a continuation of the steady improvement which has been notable for some weeks. There has been an increase in inquiry from the outlying territory as well as from the local industries. The impression is being strengthened that industrial activities will increase steadily. The demand for tools is general and is for both additional capacity and replacement. The lists are not individually large, but the aggregate is quite satisfactory. Second-hand tools are in reasonable request and good collections are reported.

The Banner Iron Works, St. Louis, will build a two-story addition to its factory and install new equipment.

The works of the Hammar Brothers White Lead Co., St. Louis, at East St. Louis, Ill., were destroyed by fire last week. The corroding department was entirely destroyed. The loss was about \$250,000. Plans for replacement are under way.

The Typewriter Calculating Attachment Company, St. Louis, will equip a plant to manufacture a patented device. S. G. Sutherland and others are interested.

The St. Louis County Producers' Market Company, St. Louis, will install refrigerating, heating and lighting equipment and an incinerator. Henry Meyers is president.

The Monroe Construction Company, 4350 Euclid avenue, St. Louis, is reported in the market for woodworking machinery. John S. Hemphill is president.

The Continental Boiler & Sheet Iron Works, St. Louis, Mo., has been incorporated with a capital stock of \$4000 to operate a boiler and sheet metal shop. The incorporators are George F. Kerwin, E. G. Bornemann and J. W. O'Brien.

The Fayette Garage Company, Fayette, Mo., has been incorporated with a capital stock of \$15,000 by D. B. Denny, and others, and will install repairing equipment.

The Katz-Bachmann Mfg. Company, Kansas City, Mo., has been incorporated with a capital stock of \$20,000 by Louis P. Katz, E. H. Bachmann and J. W. Katz. It will equip a manufacturing plant.

The Missouri Valley Cold Storage Company, Kansas City, Mo., has been incorporated with a capital stock of \$250,000 by F. G. Crowell, W. E. Hazen and Edward S. North. It will equip a cold storage and refrigerating plant.

The Morris-Blodgett Drop Forge & Tool Company, Independence, Mo., is in the market for an electric welder.

The city of Sibley, Mo., will expend \$18,000 on an electric light and power plant.



The Lebanon Elevator Company, Lebanon, Mo., has been incorporated with a capital stock of \$15,000 by John A. and A. T. Elliott and Dean M. Martin. It is reported in the market for equipment.

A 10-story building will be erected at Kansas City, Mo., by the Coca Cola Company, Atlanta, Ga. It will be equipped as a branch plant.

The State Capitol Commission, Little Rock, Ark., will receive bids until March 3 for power and heating equipment for the State capitol. Electric generators are dependent upon legislative action.

The Vandervoort Canning Company, Vandervoort, Ark., has been incorporated with a capital stock of \$13,000 by Geo. E. Edmond, G. H. Barnes and F. R. Crain, and will equip a cannery.

The Choctaw Brick & Gas Company, Mansfield, Ark., has plans for the installation of equipment for the manufacture of drain tile.

A machine shop will be installed in connection with the electric light plant at Harrison, Ark. Percy W. Winters may be addressed.

McDonald Brothers, Helena, Ark., will equip a mill in connection with their 10,000 acres of timber land in Clark County, Ark.

E. B. Causey, Higden, Ark., has bought the Baker Brothers Lumber Company's mill and will add some equipment, it is stated.

The city of Eureka Springs, Ark., will install a filtration plant and bids are to be sought on the mechanical equipment therefor. Albert C. Moore, Joplin, Mo., is engineer.

The Arkansas Handle Company, Little Rock, Ark., has been incorporated with a capital stock of \$10,000 by A. G. Wheeler, E. R. Norton and E. B. Hartwell. It will improve the equipment of the Berry Company's factory, which has been bought.

The Sanitary Veneer Barrel Company, Little Rock, Ark., has completed plans for a factory of 15,000 bbls. daily capacity and will install equipment therefor. H. I. Cutsinger, Indianapolis, Ind., is president.

A 30-hp. turbine water wheel is sought by John Smedley, Midland, Ark.

The Swindler Gas & Oil Company, James A. Swindler, president, Muskogee, Okla., is reported in the market for drilling equipment, including pumping jacks, engines, etc.

The Cushing Electric Light & Power Company, Cushing, Okla., has plans for the installation of two 60-kw. transformers and transmission equipment and other apparatus for a 60-hp. pumping equipment.

The Choctaw Cotton Oil Company, Ada, Okla., will rebuild its plant, recently burned, and will add machinery for handling cold pressed cake.

The Brookhaven Lumber Company, Brookhaven, Miss., will equip a lumber mill, including sawmill, kiln, band mill, sizer, gang and edger, power plant, etc., of a capacity of 40,000 ft. of yellow pine lumber daily.

A sawmill of 50,000,000 ft. annual capacity is being equipped at Laurel, Miss., including two band saws, one horizontal and one vertical band resaw, power house, etc., under the direction of the Marathon Lumber Company, of which W. H. Bissell, Wausau, Wis., is head.

The city of Batesville, Miss., will receive bids until March 3 for furnishing equipment for a waterworks. The Dabney Engineering Company, Memphis, Tenn., is the engineer.

A large addition to the cold storage plant of Swift & Co., Oklahoma City, Okla., will be built. A. G. Buxton & Co. are the contractors. Equipment orders are yet to be placed.

The Auto-Cycle Company, New Orleans, La., has been incorporated with a capital stock of \$100,000 by Arthur B. Lacour, W. J. Horner and George E. Steele to manufacture autocycles and other motor-driven machines.

The New Orleans Cycle Car Company, New Orleans, La., has been incorporated with a capital stock of \$17,500 by Julius C. Werner, Isaac T. Rhea and William S. Campbell, to manufacture motor-driven vehicles.

The Dixie Auto & Welding Company, Shreveport, La., Charles Reed, owner, is reported to be in the market for welding material and equipment; also lathes,

milling machinery, sheet iron rolling machine and a drop hammer.

## Birmingham

BIRMINGHAM, ALA., February 16, 1914.

While business continues to improve and is approaching a satisfactory volume, it is still not up to this time last year. The demand for small engines and boilers is good and gasoline engines are good sellers. Some new mine openings have caused the purchase of pumps, but the mining trade is dull. Signs point to improvement as the year advances.

The Little River Land Company, Gadsden, Ala., has been incorporated with a capital stock of \$25,000 by E. R. Lefevre, S. E. Jordan and W. G. Bellenger. Coal mines will be opened.

The Birmingham Grate Mfg. Company, Birmingham, has been incorporated with a capital stock of \$10,000 by H. L. Echolls, W. C. Ellis and others. A patent fire-place grate is to be manufactured.

It is reported that a plant for the manufacture of axle grease will be established at Lineville, Ala., by the Gibbs Lubricant Company, Chicago, Ill. C. H. Giles is president. Mica washers and ground mica are also to be manufactured.

It is understood that the Georgia Showcase Company, Columbus, Ga., has purchased the plant of the Montgomery Showcase Company, Montgomery, Ala., and will equip it with improved machinery.

The Arnold Lumber Company, Ensley, Ala., will erect a sash and door factory.

The Rome Furniture Company, Rome, Ga., will rebuild its factory burned at a loss of \$100,000.

The Lowndes County Development Company, Valdosta, Ga., plans to build a hydroelectric plant to develop 6000 hp. Gordon J. Tillman, Whigman, Ga., is the engineer.

The Franklin Light & Power Company, Hartwell, Ga., plans to construct two steam plants to develop 5000 hp. The J. B. McCrary Company, Atlanta, is the engineer.

The municipal lighting plant, Ocala, Fla., is to be equipped with a power station, generators, etc. J. C. Caldwell is superintendent.

The Doscher-Hardner Lumber Company, Jacksonville, Fla., is having plans made for a 50-ton ice plant.

The Southern Power Development Company, Charlotte, N. C., will soon start development of water-power property at Lookout Shoals near Statesville. The Hardaway Construction Company, Columbus, Ga., has the contract for a portion of the work, the total estimated to cost \$1,000,000.

The Lee County Packing Company, Fort Myers, Fla., contemplates rebuilding its packing plant recently burned at an estimated loss of \$200,000.

## Texas

AUSTIN, TEXAS, February 14, 1914.

The machinery and tool trade market continues to improve steadily. One of the most encouraging features of the outlook is the returning confidence of Eastern and Northern capital in this section. Many projects to be financed from outside the State are announced.

The Crystal Ice Company, Sulphur Springs, has given the contract for the erection of a large ice and cold storage plant to the Gilsonite Construction Company. The plant will cost about \$40,000.

It is announced by the Chamber of Commerce, Shreveport, La., that H. S. Watson, Butler, Pa., will erect a button factory.

The Cuero Ice & Bottling Works, which recently erected a new building, is preparing to install machinery for a new 80-ton capacity ice plant at Cuero.

H. T. Howard, Newton, is planning to erect an electric lighting plant.

G. P. Grossjean is erecting a machine shop at Trinity and plans to build a foundry later.

The city of Beaumont is preparing to purchase the city water works plant and system, now privately

owned, and will greatly enlarge and improve it. A bond issue of \$500,000 was recently voted and \$100,000 will be used for improvements. Ludlow Calhoun is city attorney.

The city of El Paso has voted \$250,000 of bonds, \$150,000 of which will be expended in waterworks improvements.

The Cummer Mfg. Company, Paris, has increased its capital stock from \$80,000 to \$140,000 and will enlarge its plant.

The San Angelo Foundry & Machine Company, San Angelo, is building an addition and will double the capacity of its plant.

It is stated that the shops of the Missouri, Kansas & Texas Railroad at Denison and Waco and the division shops at Smithville may be enlarged as a result of the compromise between the railroad company and the State regarding the latter's suit against the company, which provides that all Texas repair work must be done in the State. The railroad must also return its shops and terminals to Smithville and its shops to Walnut Springs.

## The Pacific Northwest

SEATTLE, WASH., February 10, 1914.

Business anticipated for some time in the mining and milling industries is materializing slowly. Local machinery houses have been kept fairly busy supplying the demand for new machinery and tools. A slight increase in the price of shingles has brought about the reopening of many shingle mills and indications are that many other mills which have been closed down will soon be reopened. Mining activities in eastern Washington and northern Idaho have been resumed to a considerable extent and machinery dealers are benefiting accordingly.

The Jamison Shingle Company, Everett, Wash., has begun the preliminary work in the construction of a large straight shingle mill. It is announced that the plant will be in operation within four months. Sixteen Sumner upright shingle machines will be installed, and the plant will have a capacity of between 600,000 and 700,000 shingles for a 10-hour run. Neil Jamison, Everett, is president.

The city of Pullman, Wash., will make extensive improvements to its municipal water system, including the installation of a 1000-hp. pump of 1000 gal. per min. capacity.

It is now announced that the first development of the Western Mills Company, Seattle, Wash., will be a 30,000-hp. hydroelectric plant.

Owing to the increasing power requirements of the Crown-Columbia Paper Company's mill at Camas, Wash., it is expected that additional capacity will be added to the plant of the Northwestern Electric Company at that place. The paper mill is putting in new grinders, with an 1800-hp. motor, etc.

Conconnolly, Wash., is to have a municipal water system. Work will be started as soon as the weather permits. Wells & Morris, Wenatchee, are the engineers.

The Cashmere Water Power Company plans to build a 2500-hp. hydroelectric plant near Leavenworth, Wash.

J. H. Bloedel, president Bloedel-Donoval Mills Company, Bellingham, Wash., one of the largest lumber mills on the Pacific coast, states that his plants will be electrified at a cost of \$60,000. Contracts for the machinery required will be let in the early spring.

The Cloud Field Canning Factory, Emmett, Idaho, will be reopened and placed on a sound financial basis. The factory will be moved, its capacity increased, and considerable new machinery installed.

F. P. Ake, Mountain Home, Idaho, has practically completed arrangements for the erection of an ice-making and refrigerating plant to be erected at once.

The Shelby Co-operative Creamery Association, Shelby, Mont., has been incorporated with a capital stock of \$10,000. Incorporators are N. Morton, James A. Johnson, H. F. Guth and C. D. Kicker, of Shelby. A large creamery will be built.

C. T. W. Piper, Burnaby, B. C., will build a 100,000 per day capacity shingle mill at Port Haney, B. C. A site has been secured and construction will begin March 1.

The Oregon Power Company, Springfield, Ore., will shortly issue a call for bids for conveyor machinery to be installed in a fuel storage plant in that city. The company also purposes building a power plant in Springfield. Individual motors will be used to drive the conveyor machinery and a large amount of other machinery will be purchased.

## Eastern Canada

TORONTO, ONT., February 16, 1914.

The Union Metal Company, Canton, Ohio, manufacturer of pressed metal goods, etc., will establish a Canadian branch at Galt, Ont. In the meantime it will manufacture in the Galt stove and furnace works.

The William Neilson, Ltd., Beachville, Ont., will erect a \$30,000 factory. Work will be started this spring. The company will install a big condenser. A. Huntley is manager.

The Horn Brothers Woolen Mills, Lindsay, Ont., will erect a large extension and will install the latest machinery.

The Clauss Shear Company, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by John H. Clauss, and others, to manufacture shears, scissors, and all kinds of cutlery.

The Beeson Non-Skid Tire Band Company, Ltd., Ford, Ont., has been incorporated with a capital stock of \$40,000 by Bert J. Beeson, and others, Walkerville, Ont., to manufacture automobile accessories, etc.

The Beam Brothers Mfg. Company, Ltd., Waterloo, Ont., has been incorporated with a capital stock of \$40,000 by Nathaniel Beam, Gideon Beam, and others, to manufacture engines, farm implements, etc.

The Uranisphere Company, Ltd., Brantford, Ont., has been incorporated with a capital stock of \$100,000 by William J. Park, and others, to manufacture machinery.

Scheifele & Fischer, Ltd., Waterloo, Ont., has been incorporated with a capital stock of \$40,000 by Ornan G. Scheifele, and others, to manufacture brick, tile, etc.

The Buff Pressed Brick Company, Hamilton, Ont., has been incorporated with a capital stock of \$40,000 by James R. Roberts, and others, to manufacture brick, tile, etc.

The Canadian Maier Company, Ltd., Toronto, has been incorporated with a capital stock of \$25,000 by Russell E. Evans, and others, to manufacture watches, etc.

## Western Canada

WINNIPEG, MAN., February 13, 1914.

There is a better tone in the machinery market, although not much increase is seen in the volume of business. The industrial outlook is more encouraging. Many municipalities are planning improvements, and some towns will install waterworks and other utilities. Leading financial authorities are predicting a greater flow of Eastern money to the West in the near future, and industrial projects that have been delayed on account of the recent financial stringency will no doubt be carried out.

Kenneth Morrison has organized a company and has purchased 16 acres of land near Vancouver, B. C., where he will erect buildings for the manufacture of nails, etc.

The International Supply Company, Ltd., Medicine Hat, Alberta, has been authorized by the stockholders to increase the capacity of its plant, it being the intention to make it sufficient to enable the company to supply the entire trade of western Canada in gas and oil well drilling supplies, etc. Extensions will be made as the business demands. The officers elected are as follows: President, Colonel Frank O. Sissons; vice-president, Eugene Coste; managing director, W. R. Martin.

The International Linseed Oil Company, Ltd., has decided to erect a flax mill at Moose Jaw, Sask., to cost in the neighborhood of \$750,000. Work on the new plant will be started at once.

J. B. Weir & Co., 737 Pacific street, Vancouver, B. C., have prepared plans for an electrically-driven



sawmill to be located on the Fraser Valley line of the British Columbia Electric Railway. The mill will be equipped with heavy machinery and have a capacity of about 25,000 ft. per day.

The city of Port Arthur, western Ontario, is preparing to spend \$800,000 on waterworks and sewerage system this year.

The Gilbert Hunt Mfg. Company, Maple Creek, Sask., will erect a plant to cost \$100,000. The company has a capital stock of \$700,000. All kinds of machinery and farm implements will be manufactured.

The city of Regina, Sask., will spend \$244,000 to fit a power house with equipment capable of furnishing an output of 6000 kw. The city will also install a 1200-kw. transformer to cost \$23,000. Two 500-hp. boilers will be equipped with new drums and steel frames at a cost of \$7193.

The Robert McNair Shingle Company is erecting a plant at Port Moody. A battery of 12 machines, of 350,000 shingles a day capacity, will form the equipment. J. R. Crockett is superintendent.

The Security Rubber & Supply Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$300,000 by R. H. Richardson, and others, to manufacture rubber tires and automobile accessories, etc.

At a meeting of the directors of the Winnipeg River Power Company, Winnipeg, Man., it was decided to proceed with the development of power at the Great Bonnet Falls.

J. W. Lauman, secretary-treasurer of the town of Kerrobert, Sask., is calling for tenders for machinery and other equipment for a waterworks plant. Chipman & Power, 47 Canada Life Building, Winnipeg, and Mail Building, Toronto, are the engineers.

J. S. McDonald, of the Phoenix Company, Eau Claire, Wis., is planning to establish a factory at Vancouver, B. C., making gas-electric engines, passenger cars, tractors, motor trucks, etc.

## Government Purchases

WASHINGTON, D. C., February 16, 1914.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until March 3, schedule 6390, for differential blocks and chain for Boston; until March 10, schedule 6401, for an electric crane for Brooklyn; schedule 6399, for an electrically driven triple plunger pump for Boston; schedule 6402, for pneumatic calking, chipping, scaling and riveting hammers, and wood-boring machines for Brooklyn; schedule 6398, for a universal milling machine for Washington; until March 17, schedule 6407, for refrigerator plant parts for Mare Island.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until March 14 for motors, transformers and an electric distributing system for Newport; until March 28, for coaling station equipment for Pearl Harbor, H. T.

The Isthmian Canal Commission will open bids February 27, under circular 827, for about 30,000 small steel tools; until February 28, under circular 828, for 80 vanadium steel driving springs for class 651 locomotives and for 100 car journal bearings.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, February 10, for supplies for the Navy Yards as follows:

Schedule 6281, Ordnance.

Class 41, f.o.b. works—400 Forgings.—Bethlehem Steel Company, \$69,671; Cleveland City Forge & Iron Company, \$127,800; Erie Forge Company, \$58,246; Midvale Steel Company, \$64,365; National Tube Company, \$70,350.

Schedule 6283, Steam Engineering.

Class 51, Portsmouth—One core wire straightening machine, motor-driven—Blake & Knowles Steam Pump Works, \$514; Manning, Maxwell & Moore, \$528; Wingham, Sanger & Bates, \$500.

Class 53, Portsmouth—One core cutting-off coring machine—Wadsworth Core Machinery & Equipment Company, \$375.50.

Schedule 6294, Ordnance.

Class 111, Lake Denmark, N. J.—One horizontal duplex pump—Advance Pump & Compressor Company, \$952; Dean Brothers Steam Pump Works, \$1104; Dean Steam Pump Company, \$1100; Fairbanks, Morse & Co., \$1105; Kemp Machinery Company, \$1319; National Electrical Supply Company, \$1422; William E. Williams, \$1344; Watson-Stillman Company, \$1700.

## Interesting Special Acid-Resisting Castings

Two castings of anti-corrosion metal have recently been made at the plant of the Morgan Engineering Company, Alliance, Ohio. One of these was a casting for the body of a pump intended to be used for handling large quantities of diluted acid and dirty water. This casting, which was one of a lot of three, required metal from three crucibles and weighed 1680 lb. when thoroughly cleaned up. It is stated that no blowholes or other irregularities were encountered in cleaning up the casting and that the metal averaged closely to the same analysis throughout, showing that the three meltings were the same and the heats similar. This acid resisting metal will be used for all the mechanism of the pump, thus preventing any damage from corrosion.

Another casting was a chain employed for handling material into pickling baths where portions of it are submerged in the acid or exposed to the action of the fumes. The size of the chain and the tendency for the links to cast solid are difficulties frequently encountered in the casting of chains of this nature. A four-quarter mold, built up of core sand and baked was used in conjunction with molds of the ordinary type. The alternate links were cast separately in the regular molds and were finished before being fitted into the special molds for connecting and the joining links cast around them. It is stated that this method eliminated the forming of blowholes that are sometimes found when it is attempted to cast the chain at a single pouring. Chains of this kind have been in service for periods of from 3 to 4 yr.

The W. A. Case & Son Mfg. Company, Buffalo, N. Y., has been incorporated with a capital stock of \$2,500,000, to take over the business of the unincorporated company of the same name. It manufactures mill, plumbing and steamfitting supplies, refrigerating machinery, etc. Its extensive plant is at Mississippi, Elk and Liberty streets and the Delaware, Lackawanna & Western Railroad, with general offices at 31 Main street. Whitney G. Case is president; Joseph P. Fell, vice-president and treasurer, and Edward W. Case, secretary.

The Vilter Mfg. Company, Milwaukee, Wis., manufacturer of Corliss engines and ice and refrigerating machinery, states that not only is its American trade holding up well but foreign business, forming one-fifth of its total, is better than normal. Shipments are made to foreign countries every week. One went to the Canary Islands and another to Mexico City last week. The plant is running night and day.

The entire plant of the Canada Steel Company, Ltd., on Sherman avenue, Hamilton, Ont., which was partly destroyed by fire last August, has been rebuilt and is now ready for operation. It is larger and more complete than before the fire. The additions and parts rebuilt include new machinery; cost approximately \$100,000.

The Badger Steel Roofing & Corrugating Company, LaCrosse, Wis., which recently increased its capital by \$100,000, will use part of the new issue to carry out a profit-sharing plan among old employees and the remainder for enlargement of the business. No immediate construction will be undertaken, however.

The Buffalo Forge Company has opened offices at 176 Federal street, Boston, Mass., for its fan, ventilating and pump departments, being represented in the New England territory by B. R. Andrews, formerly with the B. F. Sturtevant Company.

## Trade Publications

**Vertical Air Compressor.**—Gardner Governor Company, Quincy, Ill. Booklet AC7. Points out the adaptability of this machine for garage use, where an ample supply of compressed air is required for various purposes. The special features of the compressor are briefly touched upon, followed by illustrations, with brief tables of specifications, of air and water cooled compressors arranged for belt and electric motor drive and portable units designed for operation from the nearest electric light socket. Where electric current is not available portable and stationary compressors arranged for belt drive from a gas engine can also be furnished.

**Flexible Shafting.**—Plank Flexible Shaft Machine Company, Grand Rapids, Mich. Catalogue No. 5. Lists the various uses that may be made of the company's flexible shaft, which was illustrated in *The Iron Age*, April 10, 1913. A number of views of the different applications of the shaft are given, together with a brief outline of its construction.

**Vacuum Cleaners.**—Hanlon & Wilson, Wilkinsburg, Pa. Calendar measuring 13 $\frac{3}{4}$  x 19 $\frac{1}{4}$  in. Shows a factory type vacuum cleaner, as well as two smaller portable sizes. The calendar commences with February 1 instead of the first of the year, and the figures, which are large and easily read, are boxed in by rules.

**Cold Metal Cutting-Off Saws.**—Earle Gear & Machine Company, Wyoming & Stenton avenues, Philadelphia, Pa. Bulletin D. Describes and illustrates a line of cold metal cutting-off saws for handling round stock up to a maximum diameter of 10 $\frac{1}{2}$  in. A general description of the construction of these machines is given, together with engravings of condensed specification tables of three sizes. An illustrated description of these machines appeared in *The Iron Age*, November 6, 1913.

**Shaping Machines.**—Gould & Eberhardt, Newark, N. J. Catalogue. Relates to the company's line of High-Duty shaping machines and the attachments that are furnished. An interesting feature of the catalogue is a view of a machine built in 1875, as compared with one of the present day. After a general description of these machines, which is supplemented by a number of halftone engravings, illustrations with descriptions on the facing pages are given of 14, 16, 20 and 24 in. machines. The company's new 28-in. machine is illustrated and described, and there are a number of engravings showing various arrangements of electric motor and single pulley drive. The different attachments which can be furnished are illustrated and briefly described and a discussion of the shaping machine as a manufacturing tool is given, together with illustrations of two operations performed by this company's machines.

**Drying Apparatus.**—American Blower Company, Detroit, Mich. Miniature booklet No. 192. Concerned with the construction and use of apparatus for the artificial extraction of moisture from materials of different kinds. The apparatus employed consists of a heater made up of vertical steam pipe, incased in a sheet steel jacket with a fan attached to one end. This fan forces warm air over the coils into the drying room, it being possible to vary the volume by regulating the speed of the fan and the temperature by a turn of the valve admitting steam to the pipe coils. A number of views of the several types of apparatus are given, together with a list of the materials for which apparatus can be furnished.

**Safety Crabs and Winches.**—Brown Hoisting Machinery Company, Cleveland, Ohio. Pamphlet C. Covers a line of crabs and winches for which there is claimed to be no danger from the handles flying back and the load dropping. When the load is being raised the crab locks itself automatically when the handles are released and the lowering of the load is accomplished by simply turning the handles backward, the lowering ceasing when the cranks are released. Views of the standard crabs and winches are given, together with a table of the sizes in which they can be supplied. A brief description of the safety lowering device employed is also included.

**Air Compressors.**—Gardner Governor Company, Quincy, Ill. Circular AC8. Illustrates what is termed a one-tool plant, which is designed for use as a small compact outfit that can be operated from a lamp socket. The plant consists of a vertical, self-oiling air-cooled compressor, connected by gearing to a  $\frac{1}{2}$  hp. electric motor and a cast-iron receiver. A brief description of the various portions of the outfit is given together with a short statement of its advantages. Mention is also made of a similar air compressor arranged for a gasoline engine drive.

**Cranes.**—Deutsche Maschinenfabrik A.G., Duisburg, Germany, Neumeyer & Dimond, 82 Beaver street, New York City, American representatives. Catalogue. Size, 6 $\frac{1}{2}$  x 8 in.; pages, 152. Is made up almost entirely of halftone engravings showing various types of cranes with a brief statement

of the capacity of the crane and in some cases the place at which it is used. The cranes shown include slewing, locomotive, traveling, revolving locomotive, jib, stationary, portal and semi-portal, gantry and grab styles. Mention is also made of other allied lines, such as discharging bridges, coal handling plants, lifting magnets, grab buckets, car dumpers and floating cranes.

**Band Saw Sharpening Machine.**—Covel Mfg. Company, Benton Harbor, Mich. Circular. Illustrates and describes an automatic machine for sharpening band saws which was illustrated in *The Iron Age*, October 30, 1913. The construction and various adjustments of the machine are gone into at considerable length and a complete set of instructions for installing and operating the machine is included. The capacity of the machine includes saws ranging in width from 1 to 6 in. and with teeth spaced from  $\frac{1}{2}$  to  $1\frac{1}{4}$  in. from point to point.

**Bending Brakes.**—Dreis & Krump Mfg. Company, 2909 South Halsted street, Chicago, Ill. Catalogue No. 14. Illustrates a line of brakes for bending steel and iron sheets. A general description of the construction of the various machines is given, followed by illustrations of several kinds of hand and power brakes, with a brief statement of the character of the work for which they are adapted. Included among these is an extra heavy type of machine for handling  $\frac{3}{4}$ -in. plates up to a maximum width of 16 ft., which was illustrated in *The Iron Age*, November 6, 1913. A feature of the catalogue is a list of sizes of the machines, giving the length of the forming edge and the gauge that it will bend. These machines are built with forming edges ranging from 36 $\frac{1}{2}$  in. up to 16 ft. and for bending sheets all the way from No. 16 gauge to  $\frac{1}{2}$  in.

**Duplex Pumps.**—Dean Bros. Steam Pump Works, Indianapolis, Ind. Circular. Is a reprint of an article appearing in the Engineering Record descriptive of two pumps which are used to pump water to the summit of Mt. Washington, against a pressure of 2250 lb. A description of the pump, which forces the water through a 2-in. pipe line, and the construction of the line is given.

**Gears.**—Earle Gear & Machine Company, Stenton and Wyoming avenues, Philadelphia, Pa. Folder. Pertains to a line of gears which can be furnished by this company to specifications. These include spur, mitre, bevel, herringbone and spiral gears, wormwheels, sprockets, ratchets, speed reducing mechanism, etc. A number of views of the different kinds of gears that have been supplied are included.

**Steam Separators.**—Harrison Safety Boiler Works, North Philadelphia Station, Philadelphia, Pa. Pamphlet. Size, 6 x 9 in.; pages, 36. Is an introduction to the company's general separator catalogue No. 550. Discusses the economy of using steam and oil separators, the insurance value of separators, the mechanism for separating oil and water from steam, the efficiency of separators, etc. The advantages claimed for the removal of water from the steam are that each per cent. of moisture removed from the steam saves a corresponding amount of steam and that the removal of water decreases the wear upon the turbine blades, and also makes it possible to lubricate reciprocating engines with 25 to 50 per cent. less cylinder oil. A location for the separator, between the boiler and the superheater, which prevents the accumulation of scale in the latter, due to the priming of the boilers, is recommended. Tests showing that it is possible to reduce the amount of oil in condensates to less than 1 part per million by the use of the oil separator are quoted.

**Powdered Coal.**—Quigley Furnace & Foundry Company, 105 West Fortieth street, New York City. Bulletin No. 4. Is concerned with the use of powdered fuel as coal, and consists for the most part of extracts from a paper read at the October meeting of the American Foundrymen's Association. Illustrations are given of a number of cases in which powdered coal is used for fuel, together with the apparatus employed in the production of this kind of fuel. Mention is made of two cases where the coal was used for furnace fuel and savings of 40 and 48 per cent. respectively were secured.

**Feed Water Heaters.**—National Pipe Bending Company, New Haven, Conn. Catalogue No. 51. Contains a brief discussion of the advantages of heating feed water with exhaust steam, from the standpoint of the saving in fuel and increased boiler capacity, and points out the advantages of using a closed heater. A description of the heater is given, together with dimension tables and views of the heating coils. Some notes on the erection of the heater and a brief description of a horizontal oil separator are included.

**Quick Change Gear Lathe.**—Bradford Machine Tool Company, Cincinnati, Ohio. Pamphlet. Describes an 18-in. heavy pattern lathe with a single pulley drive to a geared head, which was illustrated in *The Iron Age*, November 6, 1913. The special features of the lathe are pointed out, followed by a brief description of its construction, the text being supplemented by a number of engravings. A view of the machine is given, together with a condensed table of specifications.





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